



AGRICULTURAL RESEARCH INSTITUTE

PUSA

DEPARTMENT OF AGRICULTURE
AND
TECHNICAL INSTRUCTION FOR IRELAND

JOURNAL

312166
IARI

VOLUME XIV.

[OCTOBER, 1913, TO JULY, 1914.]



DUBLIN:
PRINTED FOR HIS MAJESTY'S STATIONERY OFFICE,
By BROWNE AND NOLAN, LIMITED, NASSAU STREET.

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Vol. XIV.

[OFFICIAL COPY]

No. 1.

DEPARTMENT OF AGRICULTURE
AND
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JOURNAL.

The Value of Roots for Wintering Young Stores—First Irish Egg-Laying Competition—Farmwomen's Institutes in America—Profitable Trees—Irish Lace and Crochet—Early Potato Growing—Crop Report—Fruit Crop Report—Egg Records for the Year 1912-13—Avondale Forestry Station—Liming of Land—Husk or Hoose in Cattle—Marketing of Fruit—Official Documents—Notes and Memoranda—Statistical Tables.

FOURTEENTH YEAR

No. 1

OCTOBER, 1913.



DUBLIN:

PRINTED UNDER THE AUTHORITY OF HIS MAJESTY'S STATIONERY
OFFICE

BY BROWNE AND NOLAN, LTD., NASSAU STREET

To be purchased, either directly or through any Bookseller, from
E. PONSONBY, LTD., 116 GRAFTON STREET, DUBLIN; or
WYMAN AND SONS, LTD., 29 BREAMS BUILDINGS, FETTER LANE, LONDON, E.C., and
54 ST. MARK STREET, CARDIFF; or
H.M. STATIONERY OFFICE (SCOTTISH BRANCH), 23 FORTH STREET, EDINBURGH;
or from the Agencies in the British Colonies and Dependencies,
the United States of America, the Continent of Europe and Abroad of
T. FISHER UNWIN, LONDON, W.C.
1913.

PRICE SIXPENCE

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NOTICE.

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Communications respecting Advertisements should be addressed to ALEX. THOM & CO. (LIMITED), MIDDLE ABBEY-STREET, DUBLIN; or to LAUGHTON & CO. (LIMITED), 8 WELLINGTON-STREET, STRAND, LONDON, W.C., and not to the DEPARTMENT OF AGRICULTURE AND TECHNICAL INSTRUCTION FOR IRELAND.

THE VALUE OF ROOTS FOR WINTERING YOUNG STORE CATTLE.

Since Stockraising is the most important branch of Irish agriculture, no kind of experimental work is likely to prove of more general interest and practical utility to agri-

Importance of culturists in this country than investigations

Live Stock bearing directly upon problems connected with the

Experiments. live-stock industry. From the nature of the industry and the varying conditions under which

it is carried on, it follows that there must be many points upon which more precise information is required. Indeed, it would be difficult to mention any recognised system of feeding or managing stock concerning which practical men hold similar views. Although the opinions of stock-raisers are entitled to respect, because they are generally based upon experience gained under certain conditions, few thinking men will be disposed to question the necessity of attacking these problems by that most reliable of methods, the carrying out of carefully planned and executed experiments.

Whilst it cannot be claimed that dogmatising from experimental data is permissible, still it must be conceded that information so acquired is of very great value in stimulating thought and in confirming or refuting individual views upon certain questions.

Live stock experiments, however, as explained previously,* present considerable difficulties; the scope of the work is large, and a considerable number of animals must be experimented with before reliable deductions can be drawn. It follows, therefore, that progress must be somewhat slow.

Much useful information has already been obtained and published† regarding the value of a number of concentrated foods, both home-grown and imported, for certain classes of stock. It has now been found possible to devote some attention to experiments intended to demonstrate the value of more bulky foods, such as roots.

There are few points worthy of more careful consideration by farmers than the economical use of roots. In an agricultural country like Ireland the subject is of great importance because the area of land under tillage is determined very largely by the results obtained from the feeding of roots to stock. In the great majority of cases, roots must be consumed on the farm, and unless a farmer is reasonably sure that the expense incurred in growing

* See JOURNAL, Vol. XIII., No. 3, p. 500.

† See JOURNAL, Vol. V., No. 3, p. 125; Vol. XI., No. 1, p. 142; Vol. XII., No. 1, p. 52; Vol. XIII., No. 3, p. 500.

root crops will be recouped by feeding the produce to stock, he is naturally inclined to reduce his tillage area to a minimum. Especially is this the case where labour is inadequate or costly. For a number of economic reasons, which need not be specified here, it is most desirable from a national standpoint that the tillage area should be extended. Mixed tillage farming is successfully practised in many parts of the country, and the system is admitted to be admirably suited to the climate and soil.

An appreciable revival of tillage is scarcely to be looked for, however, unless farmers can see their way to utilise profitably farm produce, notably roots, for which there is no ready market.

In view of these considerations, the Department decided to carry out a series of experiments to demonstrate the value of roots when fed in conjunction with certain concentrated foods to weaned calves during their first winter. Accordingly, in the winter of 1910, experiments were commenced simultaneously at the Athenry and Ballyhaise Agricultural Stations. The tests were repeated during the two following seasons.

The details and results of the experiments are summarised below.

The object of the experiment was to ascertain the effect of replacing one pound of a cake and meal mixture with one stone of roots in an average winter ration for calves.

Nature of the Experiment. During the three seasons mentioned, 118 calves, of an average age of approximately nine months, were fed on the experimental rations. The calves were divided into two lots, as even as possible in every respect. Each lot was treated exactly alike except as regards the amount of roots and concentrated foods given. The daily ration per head was as follows :—

LOT I.

2 stones roots.

2 lbs. cake and meal mixture.

LOT II.

1 stone roots.

3 lbs cake and meal mixture.

During the early part of the winter, Aberdeen yellow turnips were used; subsequently these were replaced by swedes. Of the total quantity of roots consumed, about one-third consisted of yellow turnips.

The cake and meal mixture consisted of linseed cake, crushed oats and maize meal, in equal proportions.

Both lots received equal quantities of fodder; water was supplied *ad lib*. At Ballyhaise, the fodder consisted entirely of hay; at Athenry oat straw was fed part of the time and hay during the remainder. During the time the calves were receiving straw at the latter centre the allowance of concentrated food was slightly increased to compen-

sate for the poorer feeding quality of the straw as compared with hay. The character of the cake and meal mixture was somewhat modified also at this centre during the first two seasons, but as both lots of calves got exactly the same mixture, this fact in no way affected the main object of the experiment.

The special feeding commenced each year between the middle and the end of November, and was continued until the calves were turned out in spring. The calves were housed during the whole period. It may be mentioned here, that in order to observe whether either system of winter feeding had any influence on the subsequent growth of the calves, they were weighed each year two months after they had been put out on grass. The results of these weighings showed that both lots actually made the same increase in live weight during this period.

The principal details and results of the experiments are reproduced in the table on page 6.

It will be seen from the general average results shown in the table that the difference in live weight increases made by each lot of 59 calves was only four pounds per

Results. head at the end of a period of 154 days, in favour of the lot which received the larger quantity of concentrated food. This difference is so small that it falls well within the limits of error from which no experiment of this nature is entirely free. It is found by experience that no matter how carefully an experiment is planned and carried out, there are always a certain number of factors not completely under control that may affect the results to a greater or less extent, thus introducing a certain risk of error. These factors may have a very important effect in the case of a single experiment carried out with a small number of animals, and for this reason it is generally injudicious to draw definite conclusions from such tests. The probable sources of error are reduced to a minimum, but never entirely eliminated, when experiments are conducted with a large number of animals. In view of these facts, therefore, it is always advisable before drawing deductions from experimental data to consider, first of all, whether the results differ to a greater extent than can be attributed to probable error.

As already explained, the difference in the present instance is so small that for all practical purposes the results may be regarded as identical. Not alone are the general average figures closely similar, but a comparison of the results from each of the six individual experiments shows that in no case is the difference in live weight increase made by the two lots of calves more than about 10 per cent.—an amount which does not exceed the probable error when only a small number of animals are included.

ATHENRY CENTRE.

YEAR.	Lot.	No. of Calves.	No. of days fed.	Average weight at beginning.	Average weight at close.	Average increase.	Average daily gain.
				cwts. lbs.	cwts. lbs.	cwts. lbs.	lbs.
1910-11	I.	12	151	3 95	5 46	1 63	1.16
	II.	12	151	3 91	5 33	1 54	1.10
1911-12	I.	8	166	3 81	5 43	1 74	1.12
	II.	8	166	3 81	5 52	1 83	1.17
1912-13	I.	12	154	4 12	5 65	1 53	1.07
	II.	12	154	4 12	5 88	1 76	1.22
Average	I.		155.9	3 102	5 52	1 62	1.12
	II.		155.9	3 101	5 58	1 69	1.16

BALLYHAISE CENTRE.

1910-11	I.	8	172	3 98	5 63	1 77	1.10
	II.	8	172	3 94	5 78	1 96	1.21
1911-12	I.	8	134	4 27	6 14	1 99	1.57
	II.	8	134	4 27	6 27	2 0	1.67
1912-13	I.	11	152	4 22	5 88	1 66	1.17
	II.	11	152	4 20	5 64	1 44	1.03
Average	I.		152.6	4 13	5 92	1 79	1.25
	II.		152.6	4 10	5 90	1 80	1.26

AVERAGE OF BOTH CENTRES.

Lot I. (2 stones roots 2lbs. cake & meal)	154.4	4 0	5 70	1 70	1.18
Lot II. (1 stone roots 3 lbs. cake & meal)	154.4	3 111	5 73	1 74	1.20

From the foregoing considerations, therefore, it may be assumed that, in the experiments under review, one stone of roots produced the same live weight increase as did one pound of the cake and meal mixture. Accordingly, if a certain value be put upon the concentrated foods, the feeding value of the roots may be readily ascertained. Instead of taking the actual local prices paid for the cake and meals used in the experiments, it will probably serve a more useful purpose to value them at their average prices for a number of years throughout the country. These prices are approximately as follows :—

Linseed cake	.	.	10s. 6d. per cwt.
Crushed oats	.	.	6s. 8d. „
Maize meal	.	.	7s. 6d. „

On this basis the cost of the cake and meal mixture would be 8s. 8d. per cwt. and the value of the roots one fourteenth this amount, that is, in round figures, 7d. per cwt. or 11s. 9d. per ton. It is obvious from this example that the value of roots in any particular locality will depend upon the current prices of the concentrated foods. For instance, if the cake and meal mixture cost 7s. instead of 8s. 8d. per cwt., the value of the roots would work out at 10s. per ton. It must be observed, however, that in the above calculations no account has been taken of the manurial value of the foods. The manurial value of the cake and meal mixture amounts to about 20s. per ton, and that of the roots to 2s. 8d. per ton, or roughly 37s. for 14 tons, to make the comparison on the basis that one unit weight of the cake and meal mixture is equivalent in feeding value to 14 times that weight of roots. The greater manurial value of the roots might be set against the extra labour involved in handling this feeding stuff.

To sum up, under conditions similar to those observed in these experiments, it would appear that for young store cattle one stone of roots is equal in feeding value to one pound of a mixture of equal parts of linseed cake, crushed oats and maize meal.

This result is worthy of careful note, and suggests that further experiments on somewhat similar lines would serve a useful purpose.

FIRST IRISH EGG LAYING COMPETITION. 1912-13.

By Miss L. MURPHY, Munster Institute, Cork.

The first Egg Laying Competition held in Ireland was conducted at The Munster Institute, Cork, from 1st October, 1912, to 31st August, 1913.

The period of eleven months was fixed upon in order to allow of the houses and runs being thoroughly cleaned prior to the arrival of the birds for the competition of 1913-14.

The object of these competitions is chiefly educational. It has been evident for some time that sufficient attention is not paid to increasing the egg-production and the vigour of the pure-bred stock in the country, and that even farmers and small holders are more desirous of obtaining a bird likely to win at a local show than one calculated to improve the egg supply. While attention to outward appearance is most essential and should never be lost sight of, it should be only secondary in importance to egg-production, especially for those who keep fowls purely for utility purposes.

It is not sufficiently realised that while large incomes from poultry are attainable by only a very few skilled breeders, there is a profitable margin between the cost of keeping a well-bred pullet and the value of her output of eggs for the year.

Profits from Eggs.

The importance of a well-bred strain is often totally ignored, as is the difference between the value of a good and a bad layer. Reference to Table I., pp. 16 *et seq.*, will illustrate this difference very clearly.

The individual record is the only safe guide for the breeder, but such record-keeping is too costly and laborious for the ordinary farmer. There always remains, however, the opportunity of buying from breeders who specialise in egg-production; and for the farmer this is the quickest method of improvement to adopt.

Good results were not looked for in the first year, and it will probably be three years before a marked improvement takes place. If in the first year fifty pens of good layers were sent in from fifty different breeders, there would be less need for a laying competition.

It may be urged that the lessons of the value of breeding, feeding and housing have been already sufficiently driven home by competitions in other countries, but it is only results obtained at home and under conditions within reach of the average Irish poultry-keeper that teach any real lesson, or influence the attitude of poultry-keepers towards the egg industry.

Need for Competitions.

If there was any doubt as to the necessity for a laying competition it was dispelled by the quality of the birds sent in on 18th September, 1918. In judging results, it must be borne in mind that few, if any, of the competitors had ever seen a competition; that they had never competed, or selected or bred birds for competition; that none of our most skilful breeders make a speciality of laying qualities in their stock, or if they do, they did not enter; and that most of the pullets were average pure-bred stock as kept by the better class of poultry-keepers.

The condition of many of the birds was excellent, and showed not only that the owners knew how to rear, but also that they possessed very good judgment in their choice of probable layers. There were, however, some pens handicapped by being hatched far too early, others by being too young, and still others by being of an altogether unsuitable class for such a contest.

Mistakes in Choice of Pullets. Want of stamina was very noticeable in a few pens, and some birds were in such poor condition that it took quite two months of good feeding to get them into a sufficiently fat condition to lay.

There is no greater mistake made than to suppose that a thin pullet can produce winter eggs. The number of such thin birds sent in for the competition was not small. On the other hand, not more than a dozen birds out of the 318 were too fat.

Far too much stress is laid on the quantity of food necessary. It is the quality that counts. Given a proper diet, it does not seem possible to overfeed a laying pullet in winter.

Some of the competitors in the Leghorn classes made the bad mistake of sending three large birds of exhibition type, and three small birds of Australian or American type, and to add to the difficulty the birds were of different ages. It is quite impossible to feed such a mixed pen correctly. Where a comparison is desired it is better to enter two pens, one of each strain, and compare results.

Pen 6 (White Leghorns) would have stood far higher on the list had all the pullets been of the same type.

Attention is drawn to the facts that all the pens standing high on the list at the end of the competition were in good condition on arrival, and that no pullets in poor condition at the start made up for the time lost.

It must not be taken that condition is the only factor in egg-production, but it is beyond question that a bird starved in the growing stage will never, no matter what its breeding, make as good a layer as one that has been well fed.

The essentials for good laying are :—

Good breeding,
Good feeding,
Good housing,
Personal attention.

The poultry-keeper who feeds her birds well will get more eggs from a flock than one who does not, but no feeding can make up for want of skill in selecting a good breed ; on the other hand, the efforts of the best breeder may be completely spoiled by poor or careless feeding, or bad housing. The element of personal management can never be ignored. Some understand the needs of live stock almost by instinct, others never acquire the art, partly perhaps because they never try.

The following table gives the number of pullets penned, cost of food, value of eggs, and profit over cost of food :—

No. of pullets penned.	No. of eggs laid 1st Oct.—31st Aug.	Cost of food.	Money received for eggs.	Profit over cost of food.	Average price received for eggs.
318	doz. 3,183½	£ s. d. 88 7 7	£ s. d. 178 12 9½	£ s. d. 90 5 2½	d 13·05 per doz.

The Department laid down the rule that only the plainest food should be used ; no patent foods or spiccs were allowed, and everything was bought in small quantities at local retail prices. As will be seen from the next table, the prices paid were high, partly because they included cost of delivery.

TABLE SHOWING QUANTITY AND PRICE OF EACH FOOD USED.

Food	Quantity	Cost	
		1st Oct.—31st Mar.	1st April—31st Aug.
	cwts.	cost per cwt.	cost per cwt.
		£ s. d.	£ s. d.
Maize (cracked)	34½	} 6 9	7 0
Maize Meal	20		
Oats	67½	7 0	8 0
Wheat	4	8 0	8 6
Pollard	20	6 10½	7 3
Thirds	20	8 3	8 9
Bran	19	6 3	6 9
Linseed Cake Meal	5	10 4½	10 4½
Malt Dust	5	5 0	5 0
Meat Meal	11½	16 0	16s. to 18s.
Cut Clover (dried)	6	13 0	14 0
Turnips and Mangels	23	1 0	—
Grit	3	} 4 6	4 6
Shell	3		
Separated Milk	gals. 417	1d. per gal.	1d. per gal.
Cabbage	14 doz.	8d. per doz.	8d. per doz.

The total cost of food used was £88 7s. 7d., which works out at an average of 5s. 8d. per bird.

If the foods had been purchased in large quantities, a considerable saving could have been effected, but the idea was to buy as the average poultry-keeper buys.

Owing to the prolonged drought in June, July and August, and the consequent scarcity of green food, a quantity of dried clover had to be used as a substitute, and this added materially to the cost.

Another item which could be dispensed with in the case of ordinary farm fowls on free range is the grit and shell. It is doubtful, however, if farm fowls always get sufficient of either even when at liberty. The greediness with which the pullets consumed both grit and shell after their arrival showed that they had previously been poorly supplied.

If sufficient separated milk had always been available, less meat meal could have been used, but for pullets confined in small runs as these were, some substitute for the natural insect food is essential. Two well-known brands of meat meal were used during the competition.

The method of feeding varied with the weather. On dry days the first meal was given at 7 a.m., or in winter as soon as it was light. It usually consisted of a pint of mash* for each pen of six pullets. On wet mornings a similar quantity of grain was raked into the litter in the house. At noon sprouted oats, dry grain, or mash was given, and in the evening a full meal of mash or grain. A pint of good heavy oats usually sufficed for the evening meal, according to what had gone before. It was the usual practice to give two feeds of mash and one of grain every day, and in addition to this a hopper full of dry meals was available for the birds in every pen all through the winter. It was by means of these hoppers that an extra supply was given to the heavy layers. The pullets had a constant supply of fresh water, grit and shell within reach, and they were given as much food as they cared to eat. During the first three months, a constant check was kept on their condition by handling the pullets once a week. This was always done when they were on the perches in the evening, and in this way they soon became quite tame and did not object to being handled. Later, when they were laying freely, this weekly handling was dispensed with, as the trap nesting of the

* The stock food mixture was as follows :—

2 parts	Indian meal	}	To this was added about one-third bulk of cooked vegetables or cut clover
2 "	pollard (fine)		
1 "	tailings (thirds)		
2 "	bran		
1 "	meat meal		
½ "	linseed cake meal		

In summer, the quantity of Indian meal was reduced by one-half.

birds gave sufficient information as to their condition, and their freedom from insect pests. The food was reduced or increased as occasion required, and this constant observation and control over the feeding is one of the most essential factors towards a good supply of eggs.

The following figures show the difference in cost of winter and summer feeding :—

		Average cost per bird per week.			
		£	s.	d.	d.
Cost of Winter as compared with Summer Feeding.	1st Qr. (13 weeks) Oct.-Dec,	26	10	9½	1.54
	2nd Qr. (13 weeks) Jan.-				
	March	25	8	6¼	1.48
	3rd Qr. (13 weeks) April-				
	June	21	18	2½	1.31
	4th Qr. (9 weeks) July-				
	August	14	15	0¼	1.29

Trap nests add enormously to the labour of running a competition, but in the case of this competition they were indispensable. Without the trap nest, the individual value of the pullets could not be discovered, and the layers of small eggs as well as the bad layers would return to the owners to be used in the breeding pen the following year. The knowledge gained by means of the trap nest enables the manager of a competition to gauge pretty accurately the soundness of each breeder's method. Some of the pens were of pullets of no definite type, and their performance as layers and the size and colour of their eggs were equally varied. It will be observed on looking at Table I. (see pp. 16 *et seq.*) that the laying in the leading pens was very even. This shows care in breeding.

It is well known that one is far more likely to breed good layers from a pen like No. 31 where, while there is no outstanding hen, the average production is good, than from one good hen amongst a pen of bad layers, even though that hen might have made a record of 200 eggs per year or over.

The pens were of the plainest kind, 5 feet by 6 feet and with two large glass shutters; every fitting was movable so as to allow of thorough cleaning. The houses were cleaned every day, that is, the droppings were removed from the droppings boards, and a good layer of dry ashes sprinkled over the boards. The perches and droppings boards were thoroughly soaked in wood preservative before the competition began; this was to avoid red mite.

The eggs were all sold locally to shops and private customers. They were marketed three times weekly, and the price varied from 1s. 10d. per dozen for first-grade eggs in November, to 9d. for second grade in April and May.

At first, when some of the pullets laid very small eggs, a third grade was made, but the necessity for this soon disappeared. After December any egg of 2 oz. and over was regarded

Method of Calculating Values. as a first grade egg. At the end of each month the value of eggs at the average price for the month was credited to each hen, a deduction being made for every second grade egg. In many instances it was found that where a pullet laid more than three days in succession her egg fell below first grade, but this was not always so. Some very good layers never laid a second grade egg.

Broodiness was very prevalent during the summer. The method of breaking the pullets off was to pen them in a run where the house had no nests, and in bad cases to keep them shut out of the house all day. Being strangers to one another they did not agree well at first, and this helped to cure them of the desire to sit. Only one pen of Leghorns became broody. Reference to Table I. will show how often each pullet went broody.

The health of the birds was on the whole good, although 21, or 6.6 per cent., died. The pullets were sent to the Department for post-mortem examination and the causes of death were ascertained to be tuberculosis, coccidiosis, dropsy, rupture of veins, ovarian trouble, and in two cases no cause could be assigned. Several ailments, such as colds, protruding egg passage, impacted crop, and a few cases of chicken pox were successfully treated.

The number of pens of each breed entered gives a fair index of the relative popularity of the broods.

The general purpose breeds lead for number, weight, and value of eggs, and, as might be expected, Wyandottes, owing to their frequent successes at English competitions, were

Breeds. most numerous. They carried off first and seventh places for value, second and sixth places for weight, and second place for number. To a pullet of this breed also belongs the credit of having laid eggs of highest value during the competition, pullet No. 158 in Pen 35 having laid eggs to the value of £1 0s. 3½d.

The leading pen of Wyandottes was of a totally different type from the rest; the pullets' vigour, their sprightly appearance, disregard of bad weather, and hearty appetites, stamped them as the result of very careful breeding. They were quite distinct from the show type, and were probably the only pen of the breed that could be said to belong to any one strain, or, in other words, that were bred from one line of blood. Introducing cockerels of a strain does not entitle the raiser of pullets to describe them as *of that particular strain*, as is so frequently done. A great many of the competitors are known to use fresh blood each year, yet they describe their pullets as of one strain.

White Wyandottes.

Rhode Island Reds have done well. Pen 52 contained one hen that got crop bound on two occasions, otherwise this pen would have been higher. Pen 47 wins the prize

Rhode Island Reds. for the highest score amongst the sitting breeds, with No. 9's score of 209 eggs. The highest score was made by pullet No. 53, in Pen 53. This pullet laid 218 eggs in 41 weeks. Pen No. 53 was not in competition. The best eggs for size and colour were laid by the pullets in Pen 48.

Buff Orpingtons well maintained their reputation as good, all-round fowl. Pen 15 was, after Pen 31, the best pen of pullets in the competition.

White Orpingtons. White Orpingtons were only fair in quality, and their laying was decidedly poor.

Faverolles and Sussex are hardly suitable for a laying competition. Pen 44 made a good record, but the Sussex is before everything else a table bird, and any straining after big egg records will destroy the most desirable qualities of the breed. As a winter layer, however, it has few equals, and Pen 44 well deserved the special prize for winter laying, and also second prize for value, which was due to the number of eggs laid in November and December.

Rocks. Rocks were for the most part of poor quality, although there were some pens of good exhibition type.

The non-sitters were very disappointing; many were too early and moulted; some were much too young. Pen 6 contained excellent pullets, but the mixture of two types spoiled the record of both.

Breeds. Broodiness occurred in Pen 10 (Brown Leghorns) and the pullets should not be bred from. All the pullets in this pen were crooked breasted, and the same deformity was observed in a few of the other non-sitters.

It is obvious that Leghorn breeders will have to change their methods if this fine breed is to regain its popularity. Most of the pullets were nice in appearance, but no outward beauty can compensate for poor laying in a Leghorn, and an infusion of blood from recognised laying strains is most urgently needed.

Prizes and Certificates. Prizes and Certificates were offered for *value, weight and number of eggs*, as set out on page 15.

First Class Certificates were offered for an average of 200 eggs and over, and *Second Class Certificates* for an average of 160 and over.

Prizes for value were awarded to pens owned by the following :—

1st Prize.—£3 and Second Class Certificate :—

The Lady Dunleath, Ballywalter Park, Co. Down.

2nd Prize.—£2 and Second Class Certificate :—

Mrs. Byrne, Garryduff House, Gowran, Co. Kilkenny.

3rd Prize.—£1 and Second Class Certificate :—

Mrs. Cormack, Ballykerrin, Ballincurry, Thurles.

Prizes for weight :—

1st Prize, £3 :—

Mrs. Cormack, Ballykerrin, Ballincurry, Thurles.

2nd Prize, £2 :—

The Lady Dunleath, Ballywalter Park, Co. Down.

3rd Prize, £1 :—

Mrs. Byrne, Garryduff House, Gowran, Co. Kilkenny.

Prizes for number :—

1st Prize.—£3 and Second Class Certificate :—

Miss K. Farrell, Loughill, Longford.

2nd Prize, £2 and Second Class Certificate :—

The Lady Dunleath Ballywalter Park, Co. Down.

3rd Prize, £1 and Second Class Certificate :—

Mrs. Earl, Broughillstown House, Rathvilly, Co. Carlow.

In addition the following “ *Special Prizes* ” were awarded :—

(I.) £1 for the greatest number of eggs produced

Special Prizes. between the 1st October, 1912, and 31st January, 1913 :—

Mrs. Byrne, Garryduff House, Gowran, Co. Kilkenny.

(II.) £1 for the pullet of the non-sitting breeds making the highest score during the competition :—

Mrs. P. M'Getrick, Portinch House, Ballymote.

(III.) £1 for the pullet of the sitting breeds making the highest score :—

Antrim Agricultural School, Greenmount, Muckamore.

The Table following shows in detail in order of value the various breeds, the names of the principal winning owners, the number and value of eggs laid by each bird, and the total number and value of eggs yielded by each pen, etc. :—

TABLE

Order of Merit for Value.	No. of Pen.	Breed.	No. of Pullet.	Weight.		Eggs			
				13 Sept., 1912	30 Aug., 1913	Oct.	Nov.	Dec.	Jan.
				lbs. oz.	lbs. oz.				
Not Competing.	53	Rhode Island Red (Munster Institute, Cork.)	46	—	5 0	—	14	26	23
			48	—	5 10	—	—	16	25
			49	—	4 4	—	23	23	23
			50	—	4 10	—	12	20	19
			51	—	4 8	—	10	24	24
			53	—	6 3	—	4	26	25
1	31	White Wyandotte (The Lady Dunleath, Ballywalter Park, Co. Down.)	91	4 0	4 4	—	7	25	21
			92	4 0	4 4	20	24	23	20
			93	4 6	3 10	18	19	18	16
			94	4 0	4 0	—	18	24	22
			95	3 10	3 10	—	19	21	22
			96†	4 0	—	19	20	17	16
2	44	Red Sussex †† (Mrs. Byrne, Garryduff House, Gowran, Co. Kilkenny.)	139	4 6	5 2	11	25	13	19
			140	4 4	4 8	24	19	1	22
			141	4 8	4 12	—	16	25	20
			142	3 12	4 0	23	20	20	22
			143	4 0	5 0	24	23	12	24
			144	3 12	5 3	5	15	19	13
3	15	Buff Orpington † (Mrs. Cormack, Ballykerrin, Ballincurry, Thurles.)	241	3 14	4 12	—	26	26	23
			242	3 12	4 8	—	—	9	21
			243	3 6	4 4	—	17	24	21
			244	3 12	5 0	—	9	28	23
			245	3 14	5 12	—	—	16	27
			246	3 10	5 4	—	13	20	22
4	50	Rhode Island Red (Miss K. Farrell, Loughill, Longford.)	175	4 4	4 8	10	15	23	9
			176	4 14	4 8	2	25	21	18
			177	4 6	3 8	17	13	21	9
			178§	4 8	4 14	1	—	—	19
			179	5 0	4 4	15	23	22	18
			180†	4 8	—	—	2	21	24
5	12	Buff Orpington (Mrs. Earl, Broughillstown House, Rathvilly, Co. Carlow.)	19	4 2	3 3	1	25	20	22
			20	4 10	5 4	—	—	24	23
			21	4 10	5 10	—	19	17	13
			22	4 0	4 6	—	24	12	13
			23	4 0	5 4	13	27	24	22
			24	4 8	5 0	16	22	—	20
6	52	Rhode Island Red (Ulster Dairy School Cookstown, Co. Tyrone.)	295	5 0	4 14	—	11	26	21
			296	4 0	4 12	—	2	21	24
			297	3 6	4 0	—	10	24	23
			298||	4 10	5 4	23	21	—	3
			299¶	5 12	5 4	18	7	4	22
			300**	4 0	3 6	1	15	7	6
7	37	White Wyandotte (Miss Welsh, The Chalet, Nenagh.)	235	3 14	3 10	—	17	23	23
			236††	3 14	—	13	21	19	14
			237	4 12	5 12	19	21	19	22
			238	4 6	4 12	—	—	14	19
			239	4 0	5 4	—	14	23	23
			240	4 6	3 12	—	—	—	19

* Signifies hen was still laying at close of competition.

† Original pullet died and was replaced.

‡ These pullets were not hatched until 23rd April, 1912.

§ Moulded Oct.-Dec., 1912.

I.

Laid.							Total per Hen.	Value per Hen. <i>s. d.</i>	Untrapped Eggs.	Total Eggs from Pen.	Total Value of Eggs from Pen. <i>£ s. d.</i>	No. of times Broody.
Feb.	Mar.	April.	May.	June.	July.	Aug.						
19	24	26	16	20	18	11	197*	18 5½	3	1210	<i>£ s. d.</i> 5 10 11½	1
20	22	27	26	25	21	18	200*	17 4½				1
22	27	15	18	8	10	11	180*	17 5½				2
21	23	25	25	19	19	20	203*	18 7				
18	23	25	22	22	21	20	209*	19 3½				
24	27	26	27	23	20	16	218*	19 4½				1
20	19	17	16	16	16	12	169*	16 1½	1	1000	<i>£ s. d.</i> 4 19 5	
19	19	16	14	3	12	9	179	18 8½				2
15	17	18	17	16	16	15	185*	18 3½				
19	19	21	20	12	6	8	169	16 8½				2
14	19	17	16	15	4	14	161*	15 2				1
14	15	2	—	7	20	6	136	14 3½				
18	22	15	15	11	11	6	166	16 6	1	965	<i>£ s. d.</i> 4 15 4½	5
18	21	15	17	8	8	11	164	16 2				5
18	21	24	11	11	10	8	164*	15 5½				2
18	18	13	8	12	12	10	176*	17 9¾				4
1	18	14	11	8	4	10	149	15 7½				7
17	14	15	15	11	13	8	145*	13 8½				6
21	22	16	15	12	9	8	178*	17 9		964	<i>£ s. d.</i> 4 10 4	5
16	17	13	12	5	9	8	110	10 1				5
21	21	20	16	10	17	15	182	17 10½				2
22	24	14	19	13	15	12	177	16 3½				3
23	27	25	15	18	16	7	174	15 7½				2
2	18	22	14	12	9	11	143	12 8½				4
12	10	20	20	15	11	9	154*	12 7		1039	<i>£ s. d.</i> 4 9 10½	8
17	23	23	20	20	21	18	208*	19 11				
8	11	16	12	10	10	10	137	11 6½				7
22	25	24	24	14	17	11	157	12 11¾				1
12	25	18	25	22	6	11	197*	18 9½				2
22	27	26	25	19	14	6	186	14 1½				
19	24	14	7	10	—	3	145	13 11½		975	<i>£ s. d.</i> 4 9 6½	3
20	22	23	15	7	9	15	158	14 7½				4
9	21	16	13	14	11	18	161*	12 11½				6
20	15	17	23	16	13	12	165*	14 8				6
4	11	22	19	14	14	13	183*	16 7				4
20	22	17	18	15	11	12	173*	16 9½				6
22	22	22	21	5	16	11	177*	17 0¾		902	<i>£ s. d.</i> 4 5 5½	1
24	26	25	11	16	15	1	165	14 7½				2
22	23	20	18	11	5	6	162	15 8½				
17	22	22	17	6	7	13	151*	14 8½				
18	21	20	4	18	15	5	152	14 5½				
—	17	16	6	13	7	7	95	8 11				1
20	22	20	24	19	17	14	199*	18 6		895	<i>£ s. d.</i> 4 2 6	
18	12	16	15	2	11	9	150	14 2½				4
—	22	13	19	13	10	9	167	15 6				5
22	18	16	10	8	11	11	129*	11 9½				3
23	17	16	16	11	2	11	156*	14 8½				6
22	18	17	8	1	9	—	94	7 9½				4

|| Moulded Dec., 1912.

¶ Moulded Nov.-Dec., 1912.

** Crop bound Jan., 1913.

†† Died 26th Aug., 1913.

‡‡ This pen wins "Special Prize" £1.

TABLE I.—

Order of Merit for Value.	No. of Pen.	Breed.	No. of Pullet.	Weight.		Eggs			
				13 Sept., 1912	30 Aug., 1913	Oct.	Nov.	Dec.	Jan.
				lbs. oz.	lbs. oz.				
8	8	Brown Leghorn (Miss M. Connolly, Derrygowna, Newtowncashel, Co. Longford.)	181	3 0	3 4	6	8	19	11
			182	3 4	3 12	8	18	16	12
			183	2 14	3 8	8	20	2	17
			184†	2 14	—	3	17	3	18
			185	3 6	3 12	13	17	5	8
			186	3 6	4 0	—	12	16	15
9	47	Rhode Island Red (Antrim Agricultural School, Greenmount, Muckamore, Co. Antrim.)	7	3 6	4 4	—	—	2	21
			8	4 14	4 9	15	17	16	10
			9‡	3 8	3 14	17	22	21	19
			10	4 2	4 12	—	—	—	9
			11	2 10	3 14	—	2	22	18
			12	2 14	4 8	17	18	10	14
10	34	White Wyandotte (Mrs. Byrne, Garryduff House, Gowran.)	133	3 6	4 0	—	5	21	22
			134	4 14	5 4	—	7	19	18
			135	3 12	4 12	—	—	11	19
			136	4 2	4 0	22	8	16	15
			137	3 4	4 4	—	—	—	15
			138	3 10	4 12	—	—	19	22
11	23	Barred Rock (Lieut. R. W. Smyth, R. H. M. School, Phoenix Park.)	97	3 2	4 9	—	13	22	19
			98	2 8	4 3	—	—	17	15
			99	3 2	4 14	—	—	—	6
			100	3 6	4 5	7	21	22	17
			101	3 10	4 14	—	12	22	17
			102	2 14	4 2	—	6	22	10
12	20	Barred Rock (Antrim Agricultural School, Greenmount, Muckamore, Co. Antrim.)	1	5 13	5 8	1	20	19	—
			2	5 4	4 10	—	1	—	10
			3	5 8	5 0	—	14	13	7
			4	5 2	5 4	—	—	8	21
			5§	5 14	4 14	15	—	9	26
			6	5 12	6 5	—	18	22	21
13	6	White Leghorn (Mrs. M'Ghee, Trenamullen, Stranorlar, Co. Donegal.)	67||	4 4	—	15	17	15	15
			68	3 8	4 8	—	9	14	15
			69	4 4	5 2	8	20	16	11
			70¶	2 10	3 4	—	3	13	6
			71**	2 10	—	—	—	11	21
			72	2 4	3 8	—	—	11	22
14	1	Black Minorca (Mrs. P. M'Getrick, Portinch House, Ballymote, Co. Sligo.)	229	3 8	3 13	—	21	15	16
			230††	4 6	4 13	2	21	19	19
			231	3 14	5 4	—	16	14	16
			232	3 14	4 3	—	7	11	8
			233	4 0	5 4	—	11	17	16
			234	3 6	4 2	—	—	18	13
15	51	Rhode Island Red	265	3 8	4 4	—	24	21	15
			266	3 14	4 8	—	—	14	11
			267	3 10	4 10	—	—	2	12
			268	3 14	5 10	—	21	23	21
			269	3 6	4 8	—	—	16	20
			270	3 6	3 10	—	—	8	16

* Signifies hen was still laying at close of competition.

† Original pullet died 30th May, 1913.

‡ Wins "Special Prize" £1.

§ Moulded Nov., 1912.

continued.

Laid.							Total per Hen.	Value per Hen.		Untrapped Eggs.	Total Eggs from Pen.	Total Value of Eggs from Pen.	No. of times Broody.
Feb.	Mar.	April.	May.	June.	July.	Aug.		s.	d.				
11	16	22	20	16	17	10	156*	13	11	2	893	£ s. d. 4 2 5½	
17	19	20	14	15	22	18	179*	16	4½				
16	19	18	19	15	15	16	165*	15	5½				
14	20	21	15	2	—	1	114	10	5½				
6	18	15	15	9	9	—	115	11	0½				
16	19	20	19	15	19	11	162	15	0½				
2	22	21	25	22	20	13	148	11	9½	896	896	£ s. d. 4 1 6	4 2 4 4 2
5	15	17	14	11	12	11	143	13	11½				
19	21	24	15	21	14	16	209*	19	10½				
8	14	9	10	6	9	6	71*	5	8				
3	22	18	21	13	10	8	137*	12	4½				
17	22	15	21	18	14	13	188*	17	9½				
19	23	18	16	6	15	7	152*	13	8½	891	891	£ s. d. 4 0 4½	2 1 1 1
7	18	22	22	18	13	8	152	13	11½				
16	21	20	16	10	18	15	146*	12	11½				
16	18	20	20	10	9	13	167	15	11				
21	23	21	17	10	5	15	127*	10	4½				
20	22	19	15	6	19	5	147*	13	5½				
—	22	16	14	14	15	9	144*	13	10½	812	812	£ s. d. 3 14 5	3 4 3 3 3
15	21	21	24	20	21	16	170*	15	0				
20	20	7	15	7	6	15	96	8	3½				
16	20	21	19	18	13	13	187*	16	6½				
—	20	16	16	6	4	7	120	11	9				
—	20	—	12	5	16	4	95*	9	0				
12	19	18	10	14	16	13	142*	13	8½	804	804	£ s. d. 3 13 1½	2 1
12	15	19	17	2	16	3	95	7	10½				
17	16	23	20	13	8	6	147	12	9½				
7	15	22	18	10	20	12	133	11	6½				
16	8	24	19	1	19	1	138	12	3½				
18	19	20	3	10	15	2	148	14	10½				
18	20	16	12	—	1	—	129	13	4½	773	773	£ s. d. 3 12 7	
6	14	17	9	13	12	4	113	10	8				
10	19	18	18	19	19	18	176*	16	11½				
14	11	19	17	18	13	8	122	10	10½				
14	21	18	5	3	9	2	104	9	6				
11	15	22	17	20	4	7	129	11	2½				
10	19	17	16	11	4	18	147*	13	0½	785	785	£ s. d. 3 12 3½	
17	19	23	21	20	15	17	193*	17	1½				
19	19	20	25	9	—	5	143	13	6½				
14	15	21	14	14	13	14	131*	11	9				
13	18	6	16	—	—	—	97	9	9½				
7	17	13	2	—	—	—	70	6	8½				
15	22	20	5	16	9	16	163*	16	4½	35	780	£ s. d. 3 11 11	1 1 2 1
15	16	20	17	—	2	4	99	8	11				
16	18	10	17	16	12	8	111*	9	0½				
19	22	23	19	6	4	5	163	15	9½				
15	19	21	21	11	10	—	133	11	11½				
11	14	12	8	6	1	—	76	6	11½				

|| Original pullet died and was replaced 3rd July, 1913.

¶ Broke her leg in Dec., 1912.

** Original pullet died, replaced 22nd May, 1913.

†† Wins "Special Prize" £1.

TABLE I.—

Order of Merit for Value.	No. of Pen.	Breed.	No. of Pullet.	Weight.		Eggs			
				13 Sept., 1912 lbs. oz.	30 Aug., 1913 lbs. oz.	Oct.	Nov.	Dec.	Jan.
	48	Rhode Island Red	31 32 33 34 35 36	3 10 3 14 3 10 4 10 3 12 4 2	4 10 4 8 5 10 5 0 4 10 4 14	— — 15 — — 2	— — 12 — 16 19	12 — 16 — 20 20	18 — 16 7 16 15
	11	Buff Orpington	13 14† 15† 16 17§ 18||	5 6 5 6 4 10 5 4 4 10 5 2	5 12 5 0 4 14 5 6 5 12 5 8	— 18 8 — 11 23	17 16 6 — — 25	21 — 13 17 — 24	21 — 12 19 4 15
	42	Salmon Faverolle	193 194 195¶ 196 197 198	5 4 4 0 5 2 5 2 5 2 5 0	3 14 4 6 — 5 4 5 4 6 0	1 — — — — 8	8 18 16 — — 8	18 22 16 — — —	3 12 7 5 4 12
	19	White Orpington	277 278 279** 280 281†† 282||	4 2 4 0 4 8 4 8 4 2 4 12	4 10 5 11 — 5 6 — 5 4	— — 18 — 2 16	14 — 21 — 21 18	18 — 20 4 9 19	16 5 16 22 1 5
	33	White Wyandotte	121†† 122 123|| 124 125§§ 126§§	6 12 5 6 5 14 5 4 5 6 6 6	5 0 3 12 4 14 4 2 4 10 5 2	— 20 20 — — 22	— 20 18 — — 18	— 16 12 — — 16	2 15 14 11 8 —
	39	White Wyandotte	289 290 291 292 293 294	3 10 4 4 4 2 3 12 3 12 3 12	4 3 4 6 3 14 4 4 4 10 4 10	— — 14 — — —	— — 12 14 — —	— 16 — 17 5 1	22 14 14 11 19 13
	36	White Wyandotte	223 224 225 226 227 228	3 6 3 10 4 4 3 0 3 8 3 14	4 10 4 0 5 3 3 9 4 0 4 4	— — — — — —	— 8 21 — — —	1 22 19 18 — 3	3 19 18 21 — 22
	38	White Wyandotte	247 248 249 250 251 252	4 10 5 6 4 6 4 6 4 14 5 6	4 12 5 8 4 6 5 6 5 0 4 14	— — — — 20 2	— 14 17 17 17 —	7 14 10 15 10 —	21 19 14 4 6 20

* Signifies hen was still laying at close of competition.

† Moulded Nov.-Dec., 1912.

‡ Neck moult in Dec., 1912.

§ Moulded Nov., 1912.

|| Moulded Feb., 1913.

¶ Original pullet died, replaced 17th May, 1913.

continued.

Laid.							Total per Hen.	Value per Hen. s. d.	Untrapped Eggs.	Total Eggs from Pen.	Total Value of Eggs from Pen. £ s. d.	No. of times Broody.
Feb.	Mar.	April.	May.	June.	July.	Aug.						
18	14	21	20	16	5	—	124	10 5½	1	788	£ s. d. 3 11 0½	1
4	23	22	21	18	19	—	107	8 1½				
13	15	18	17	9	9	13	153	15 1½				4
17	21	18	15	8	8	7	101	7 4½				3
16	20	19	10	9	10	8	144*	14 2½				2
15	22	21	14	7	10	13	158*	15 7½				3
14	21	16	16	9	6	5	146	14 0½	2	762	£ s. d. 3 10 9½	5
17	23	24	14	6	—	14	132	11 4½				3
9	21	15	12	11	12	11	130	12 0½				7
19	8	15	12	12	11	10	123	11 7				4
15	15	4	2	5	—	3	59	5 5½				3
—	7	21	19	11	15	10	170*	15 6½				3
10	21	23	23	12	1	—	120	10 10½	23	801	£ s. d. 3 10 5½	1
11	18	18	20	18	18	22	177*	16 6½				
18	25	15	1	2	—	1	101	9 6½				
12	25	23	9	16	9	3	102*	8 1½				
14	22	21	21	18	19	13	132*	10 9½				
8	22	20	19	16	21	20	146*	12 4½				
18	19	13	13	15	2	16	144*	14 1½		740	£ s. d. 3 10 3	4
19	22	13	12	14	11	4	100*	8 3½				3
16	23	23	6	16	4	—	163	16 7½				1
19	13	19	15	13	10	10	125*	10 4½				5
—	5	17	2	8	17	5	87*	8 7½				
—	17	11	14	8	9	4	121*	12 3½				4
20	22	22	23	17	13	3	122	9 10		756	£ s. d. 3 8 10½	
14	17	18	20	15	13	15	183*	17 1½				
3	3	23	23	19	18	10	163	15 7½				
22	22	17	7	4	10	—	93	7 9½				3
7	9	22	21	—	4	13	84	6 11½				
—	1	22	11	8	13	—	111	11 6½				2
18	20	14	10	5	8	12	109	9 7½	34	762	£ s. d. 3 8 3½	3
17	21	14	17	16	17	12	144*	12 11½				
16	20	22	19	14	8	6	145	13 3				
17	21	14	13	2	11	6	126	12 4				
15	18	19	11	15	11	9	122	10 8½				
4	18	12	18	12	4	—	82	6 0½				1
18	23	22	21	6	16	5	115	9 4	1	768	£ s. d. 3 7 6	1
17	21	19	18	19	18	4	165	14 10½				
17	20	22	13	15	15	6	166	15 9½				2
17	20	19	6	14	11	—	126	11 7½				3
20	22	24	12	12	5	13	108	8 2				3
12	17	9	14	3	7	—	87	7 9½				5
2	15	16	18	13	12	1	105	9 0	11	708	£ s. d. 3 6 8½	3
1	18	19	15	5	3	4	112	10 10½				1
—	21	24	16	9	17	—	128	11 9½				3
—	9	22	19	5	9	19	119*	11 5				
16	19	13	10	6	10	13	140*	14 1½				
10	27	15	1	—	18	—	93	8 0½				3

** Died August, 1913.

†† Moulded in June; died and was replaced 11th June.

‡‡ Moulded Oct.-Nov., 1912.

§§ Moulded Oct., 1912.

TABLE I.—

Order of Merit for Value.	No. of Pen.	Breed.	No. of Pullet.	Weight.		Eggs			
				13 Sept., 1912	30 Aug., 1913	Oct.	Nov.	Dec.	Jan.
				lbs. oz.	lbs. oz.				
	24	Barred Rock	151	5 0	5 12	—	20	21	6
			152	4 10	5 9	—	18	22	20
			153	5 14	6 6	—	—	—	7
			154	4 8	4 12	—	15	23	14
			155	4 8	5 7	—	—	—	—
			156	4 0	3 13	—	19	11	23
	9	Brown Leghorn	187	3 6	3 15	20	19	16	6
			188†	3 12	3 12	21	19	17	5
			189	2 14	3 0	—	14	22	18
			190†	3 10	3 14	5	16	3	3
			191§	3 0	3 4	—	—	—	7
			192||	3 4	3 8	4	—	—	8
	14	Buff Orpington	79	4 6	5 4	—	9	21	19
			80	3 14	5 6	—	—	18	15
			81	5 0	5 12	—	—	—	—
			82	4 14	5 8	—	—	7	17
			83	4 14	5 4	—	3	25	23
			84	4 6	5 14	—	—	—	9
	13	Buff Orpington	25	5 6	5 11	—	7	27	24
			26	5 2	5 8	—	—	20	7
			27	4 14	5 4	20	20	11	19
			28¶	4 14	5 12	—	—	—	—
			29**	5 9	—	—	20	22	22
			30	5 5	7 0	—	14	12	26
	7	Brown Leghorn	127	2 14	3 3	—	—	—	—
			128	3 4	3 12	13	22	18	6
			129	3 0	3 10	—	—	16	14
			130	3 14	3 14	—	—	—	—
			131	3 6	4 3	—	—	—	10
			132	4 0	4 0	—	10	16	5
	35	White Wyandotte	157	4 0	4 0	—	10	16	12
			158††	4 0	4 0	18	21	21	20
			159††	4 2	—	—	—	—	—
			160	4 0	—	—	11	18	17
			161§§	4 6	—	—	—	18	18
			162	3 0	4 12	—	—	—	—
	32	White Wyandotte	115|||	3 10	—	—	—	12	21
			116	4 4	4 4	—	—	16	13
			117	3 10	4 12	—	—	—	—
			118	3 14	4 6	—	5	13	14
			119	3 14	5 4	—	—	9	15
			120	3 4	6 0	—	—	4	20
	28	White Wyandotte	37	4 4	4 4	—	—	14	6
			38	5 6	4 14	—	—	4	19
			39	4 10	4 10	1	16	16	8
			40	5 0	4 3	—	—	—	10
			41	5 8	5 6	—	—	—	3
			42	5 14	5 0	—	—	4	14

* Signifies hen was still laying at close of competition.

† Neck moult Jan., 1913.

†† Moulded Oct., 1912.

§ Moulded Oct.-Dec., 1912.

|| Moulded Oct.-Nov., 1912.

¶ This pullet did not lay.

continued.

Laid.							Total per Hen.	Value per Hen. s. d.	Untrapped Eggs.	Total Eggs from Pen.	Total Value of Eggs from Pen. £ s. d.	No. of times Broody.
Feb.	Mar.	April.	May.	June.	July.	Aug.						
18	19	11	12	6	18	8	139*	13 11½				2
17	22	23	17	15	6	6	166	16 3				
10	8	22	14	9	9	1	80	6 5½	1			1
11	22	14	12	11	7	9	138	13 8½				3
—	12	14	12	10	2	—	50	3 6½		£ s. d.		3
9	12	16	12	12	11	10	135	12 7		709	3 6 7½	4
14	19	19	17	17	18	15	180*	17 7½				
17	20	21	17	—	11	3	151	15 2½				
—	14	14	—	1	8	17	108*	10 0½	1			
8	11	15	9	—	—	—	70	7 0½				
8	12	19	15	8	7	—	76	5 10		£ s. d.		
16	20	20	22	9	21	3	123	9 10½		709	3 5 9	
15	22	21	17	13	14	10	161*	15 2½				4
5	19	14	14	9	8	9	111	10 2	2			7
1	21	14	16	8	11	7	78*	5 11½				4
16	21	23	17	8	4	12	125	10 8½				2
21	23	21	20	11	12	6	165*	14 4		£ s. d.		1
21	14	20	15	13	12	9	113*	9 1½		755	3 5 8½	6
—	20	15	22	13	11	9	148*	14 1½				5
20	13	16	15	11	12	11	125	11 6½				6
19	12	26	18	16	16	15	192*	17 1½	1			7
—	—	—	—	—	—	—	—	—				4
21	19	7	—	—	—	—	111	11 0		£ s. d.		1
—	17	14	11	8	12	3	117	11 5		694	3 5 4	8
13	20	16	3	4	16	1	73	5 9½				
11	22	21	20	17	19	20	189*	18 3				
1	19	21	17	15	11	1	115	9 10½	45			
1	11	21	13	9	10	2	67	4 10½				
15	19	20	15	5	14	1	98	8 1½		£ s. d.		
8	20	20	20	7	22	2	140	12 9½		727	3 5 0½	
16	22	18	14	6	5	—	119	10 11½				
19	24	23	19	14	6	17	202	20 3½	11			2
—	—	19	22	12	7	12	72	5 2				3
18	23	17	18	12	10	7	151	13 8				4
5	—	—	—	—	—	—	41	4 10½		£ s. d.		
10	24	23	9	17	13	2	98*	7 4		694	3 3 9	2
20	19	13	9	11	2	—	107	9 10½				1
10	19	20	21	15	1	—	115	10 2				
7	21	8	16	15	4	—	71	5 5½				3
18	17	20	22	18	19	7	153	13 7½	12			1
13	20	19	18	7	12	13	126*	11 0½		£ s. d.		2
16	19	22	20	13	15	10	139	11 11		723	3 3 8½	
9	18	21	14	4	—	—	86	7 6½				2
18	24	22	12	15	6	—	120	10 3½				1
15	19	20	20	16	16	16	163*	15 4½	30			
14	21	21	19	10	14	—	109	8 1½				
4	19	20	20	14	17	15	112	8 7½		£ s. d.		
18	22	22	22	16	11	2	131	10 8½		751	3 3 5½	

** Died May, 1913.

†† Laid eggs of highest value.

‡‡ Died 19th February, replaced 22nd February, 1913.

§§ Died 27th March, not replaced.

||| Died, replaced 11th June, 1913.

TABLE I.—

Order of Merit for Value.	No. of Pen.	Breed.	No. of Pullet.	Weight.		Eggs			
				13 Sept., 1912 lbs. oz.	30 Aug., 1913 lbs. oz.	Oct.	Nov.	Dec.	Jan.
	49	Rhode Island Red	109 110 111 112† 113† 114	3 0 5 2 3 2 3 10 5 0 4 8	5 0 5 8 5 0 — — 5 0	— 23 — — 24 22	— 23 8 — 23 —	10 18 21 — 22 —	23 18 17 — 10 —
	17	White Orpington	307 308 309 310 311 312	3 12 4 0 3 10 3 10 3 2 3 12	5 1 5 8 5 11 5 4 4 14 4 8	— — — — — —	— — — 14 — 14	11 — 12 23 — 9	20 19 19 17 10 18
	18	White Orpington	271 272 273 274 275 276	3 10 3 0 3 4 3 10 3 4 3 14	5 4 4 12 4 13 5 0 4 12 4 0	— — — — — —	15 7 — — — —	21 22 — 2 22 —	20 20 9 18 9 23
	46	Light Sussex	283 284 285 286 287 288	3 12 4 4 4 2 4 12 3 12 4 6	6 0 5 2 5 4 5 8 5 4 5 0	— 1 — — — —	— 18 4 — — 10	— 17 27 — — 28	— 15 12 18 3 14
	10	Brown Leghorn	301 302§ 303 304 305 306	3 12 3 0 2 14 3 2 3 12 3 2	4 4 — 3 14 4 4 2 14 3 8	1 — — 8 — —	19 — 1 16 — 18	15 — 4 7 — 13	— — — 10 2 1
	4	White Leghorn	163 164 165 166 167 168	3 6 3 5 3 6 3 8 5 2 3 5	4 11 3 9 3 3 3 12 4 9 3 14	— — — — — —	8 7 — — 15 14	6 11 — 13 12 14	8 9 7 12 1 5
	43	Red Sussex	43 44 45 46 47 48	3 8 3 4 3 8 3 4 4 6 3 6	5 0 4 0 5 4 3 6 5 6 4 12	— — — — 22 —	— — — — 18 11	— 22 9 7 22 20	22 10 24 17 22 20
	26	Barred Rock	253 254 255 256 257 258	4 8 4 4 4 6 4 12 4 12 5 0	5 4 5 3 5 3 4 11 5 3 5 5	— — — 15 — —	— — 12 — — 13	21 — 21 20 — 9	13 12 14 1 7 15

* Signifies hen was still laying at close of competition.

† Died Nov., 1912, not replaced.

continued.

Laid.							Total per Hen.	Value per Hen. <i>s. d.</i>	Untrapped Eggs.	Total Eggs from Pen.	Value of Eggs from Pen. <i>£ s. d.</i>	No. of times Broody.
Feb.	Mar.	April.	May.	June.	July.	Aug.						
11	16	10	10	16	16	9	121*	11 0				1
1	22	21	22	21	12	9	190	18 10				
6	27	13	9	15	6	9	131*	12 6	1			6
—	—	—	—	—	—	—	—	—				
10	25	17	18	16	6	6	79	10 3		642	£ s. d. 3 3 0½	6
							120	10 4½				
14	20	10	14	7	13	—	109	9 10½				3
9	16	23	6	12	5	12	102	8 9½	10			2
16	20	18	14	7	8	12	126	11 2½				3
14	12	15	15	7	8	9	134	13 5½				6
16	11	17	9	11	7	11	92	7 10½		£ s. d. 3 2 11½		4
12	8	10	13	8	11	8	111	10 9½		684		6
14	19	12	19	13	12	9	154	15 1				5
19	22	24	19	8	3	2	146	13 9½				
22	22	14	16	11	6	9	109	9 2½				4
15	18	14	12	1	15	7	102*	8 10½				2
13	16	12	11	15	11	10	119*	9 11½		£ s. d. 3 2 7½		4
15	5	10	8	—	—	—	61	5 8½		691		2
19	16	24	12	10	11	10	102*	8 1½				4
17	12	15	18	10	10	7	140	12 6½				6
14	25	16	13	—	15	9	135	12 5½				4
20	18	12	11	8	6	9	102	8 7½				5
21	21	10	12	11	6	8	92	7 4½		£ s. d. 3 2 3½		5
17	9	12	17	7	8	11	133*	13 2½		704		6
10	20	20	17	20	16	13	151	14 1½				1
15	19	2	3	4	9	—	52	4 3½				
7	18	6	10	8	19	5	78	6 0½				
17	22	20	21	19	11	4	155*	13 9	41			
13	14	17	18	1	—	—	65	4 9		£ s. d. 3 0 0½		
15	22	13	21	18	16	2	139	12 10½		681		1
7	16	17	16	9	11	1	99	9 2½				
10	18	17	17	11	7	3	110	9 10½				
1	8	8	10	11	14	11	70	5 5½	16			
8	22	21	22	13	17	11	139	10 6½				
6	17	17	20	21	13	10	132	12 0½		£ s. d. 2 19 11½		
18	20	20	12	13	11	6	133	11 6½		699		
9	13	15	17	6	4	7	93	8 0½				5
12	14	18	19	14	7	14	130*	11 6				6
6	16	18	12	10	4	11	110*	9 7				4
—	14	16	15	14	5	2	90	7 1				4
15	26	21	12	10	3	9	158	15 8½		£ s. d. 2 19 8½		3
1	14	12	9	10	4	11	91*	7 9		672		5
8	23	10	17	—	5	1	98	9 2				1
6	12	19	5	10	11	—	75	6 0				1
12	14	22	13	5	16	14	143*	13 10½				
14	21	17	14	12	10	10	134	10 7½				7
12	20	12	12	—	12	—	75	6 2		£ s. d. 2 19 4½		
12	25	23	23	19	18	1	158	13 6½		683		

† Died June 19th, not replaced.

‡ Died, replaced May 8th, 1913.

TABLE I.—

Order of Merit for Value.	No. of Pen.	Breed.	No. of Pullet.	Weight.		Eggs			
				13 Sept., 1912	30 Aug., 1913	Oct.	Nov.	Dec.	Jan.
				lbs. oz.	lbs. oz.				
	29	White Wyandotte	49 50 51 52 53 54	3 14 4 0 4 0 4 2 4 2 4 2	4 8 4 3 4 4 4 10 4 8 4 4	— — — — — —	— — — — — —	— — 1 — 4 —	19 4 15 5 12 7
	16	White Orpington	205 206 207 208 209 210	4 14 4 8 4 14 4 12 5 0 4 6	5 8 6 0 6 6 4 0 6 0 5 0	— — — — — —	— — — 9 — —	— — 2 25 — 16	5 15 10 21 19 23
	3	White Leghorn	103 104 105 106 107 108	2 4 2 6 2 6 2 4 2 2 2 3	3 13 3 15 3 15 3 9 4 3 3 8	— — — — — —	— 6 — — — —	3 23 — 2 — 16	13 20 — 13 12 15
	30	White Wyandotte	61 62 63 64 65 66	4 6 4 8 3 2 3 14 3 8 3 12	5 0 5 8 4 8 3 14 5 8 4 0	— — — — — —	— 3 — — — —	— 16 12 13 4 18	3 3 22 12 25 24
	21	Barred Rock	73 74 75 76 77 78	3 12 3 14 3 10 3 6 3 6 4 14	5 8 5 8 4 13 4 12 5 9 5 9	— — — — — —	— — — — — —	19 4 5 12 — —	12 19 15 20 — 16
	22	Barred Rock	85 86 87 88 89 90	4 0 5 0 4 8 5 0 5 2 5 6	5 9 5 2 5 8 4 12 5 12 6 2	— 18 — 14 — —	— 15 — 21 — 14	— 9 — 22 — 22	1 — — 9 — 19
	40	Salmon Faverolle	145 146 147 148 149 150	3 14 4 2 3 10 3 8 2 14 3 4	4 8 4 8 4 8 4 8 3 8 4 8	— — — — — —	— — — — — 19	— 8 — — — 24	7 19 — — 3 17
	2	White Leghorn	55† 56 57† 58 59§ 60	4 0 3 12 3 10 3 14 3 14 4 2	4 8 3 9 — 4 5 — 4 14	9 — — — — —	— 16 — 10 — 3	21 8 1 8 — 19	19 12 6 — — 16

* Signifies hen was still laying at close of competition.

† Moulded October, 1912.

continued.

Laid.							Total per Hen.	Value per Hen.		Untrapped Eggs.	Total Eggs from Pen.	Total Value of Eggs from Pen.	No. of times Broody.
Feb.	Mar.	April.	May.	June.	July.	Aug.		s.	d.				
20	19	19	17	13	14	11	132*	11	4	53	691	£ s. d. 2 19 1	1 2 1 1
17	20	20	19	14	2	13	109	8	3½				
17	21	21	19	16	7	13	130	10	4½				
18	19	13	10	11	15	—	91	7	6				
17	19	14	11	8	14	2	101	8	9½				
18	19	17	14	—	—	—	75	6	3½				
11	25	26	9	17	15	—	98	7	9½	679	£ s. d. 2 18 9½	2 5 6 4 1	
14	18	13	13	11	10	10	104	8	10½				
—	10	10	12	7	7	6	64	5	4½				
1	21	8	9	11	—	—	105	10	9½				
17	24	20	24	18	17	16	155*	12	5½				
23	27	26	12	12	10	4	153*	13	6½				
18	24	21	17	18	17	12	143*	12	0½	680	£ s. d. 2 18 9	2 3 4 3 4	
20	23	22	22	10	15	—	161	14	9				
—	5	25	10	4	5	—	49	3	7				
20	23	24	14	12	9	5	122	10	3½				
16	22	23	14	7	9	6	109	9	0½				
19	22	16	17	1	—	—	96	9	0½				
2	18	16	22	5	10	17	93	7	5	40	£ s. d. 2 15 7	2 3 4 3 4	
4	22	22	11	7	7	6	101	8	2½				
9	20	13	13	8	6	—	103	7	11				
6	17	12	—	10	—	1	71	5	9½				
20	24	12	19	14	14	—	132	11	1				
20	21	16	14	9	10	8	140*	11	0½				
18	19	23	20	19	14	—	144	12	8½	1	£ s. d. 2 14 6½	2 2	
10	13	12	14	11	3	—	86	7	7				
10	17	21	20	7	2	15	112	9	8½				
17	16	23	13	12	14	7	134	11	10½				
—	10	22	12	—	12	—	56	4	1½				
21	20	6	13	5	8	7	96	8	5½				
13	6	22	16	—	14	2	74	5	11½	3	£ s. d. 2 14 2½	2 1 2 2 2	
—	13	21	15	15	13	11	130	11	4¾				
—	8	11	12	4	8	—	43	3	1½				
14	18	6	11	4	5	9	133	13	8½				
19	23	19	6	8	12	2	89	7	2¾				
15	17	18	6	7	6	—	124	12	5½				
14	20	18	17	5	8	17	106*	8	10½	1	£ s. d. 2 13 10½	2 13 10½	
13	22	19	18	13	12	14	138*	12	0¾				
12	21	21	14	12	17	—	97	7	6½				
13	20	19	3	13	—	—	68	5	4½				
6	2	18	12	1	—	1	43	3	2½				
15	18	23	21	12	16	13	178	16	9½				
1	20	18	16	15	14	—	133	12	4½	2	£ s. d. 2 13 3½	2 13 3½	
4	21	20	11	9	14	12	127*	11	11				
—	12	17	2	2	3	—	43	3	5				
6	19	19	7	8	14	5	96	8	8½				
3	9	20	9	—	1	—	42	3	1½				
1	17	23	19	20	15	15	148	13	6				

† Died in July, not replaced.

‡ Died, replaced June 25, 1913.

TABLE I.—

Order of Merit for Value.	No. of Pen.	Owner.	No. of Pullet.	Weight.		Eggs			
				13 Sept., 1912	30 Aug., 1913	Oct.	Nov.	Dec.	Jan.
				lbs. oz.	lbs. oz.				
	45	Red Sussex	199	4 0	5 3	—	10	23	19
			200	4 8	5 12	—	—	3	18
			201	3 14	5 14	—	—	—	6
			202	3 8	4 6	—	—	—	5
			203	3 6	5 6	—	—	—	19
			204	4 0	5 8	—	—	6	14
	5	White Leghorn	217	2 6	3 3	—	8	19	4
			218†	3 6	—	—	1	3	9
			219‡	3 10	—	—	—	—	3
			220	2 2	3 2	—	—	15	11
			221	3 14	5 4	—	—	15	9
			222	2 10	2 4	—	8	15	8
	27	Barred Rock	259	4 6	5 6	—	—	—	1
			260	4 12	5 6	—	—	—	—
			261	3 14	4 4	—	—	—	3
			262	4 10	5 14	—	—	—	1
			263	4 14	6 0	—	—	—	16
			264	4 6	4 15	—	—	14	1
	41	Salmon Faverolle	169	4 6	5 4	—	—	15	2
			170	4 0	6 4	—	—	—	—
			171	4 4	5 2	—	—	13	6
			172	4 6	5 4	—	—	5	12
			173	4 4	5 8	—	—	—	—
			174	4 4	7 4	—	—	—	—
	25	Barred Rock ¶	211	5 0	7 0	—	8	22	13
			212§	4 4	—	—	—	—	—
			213	3 8	6 0	—	—	—	—
			214||	4 0	—	—	6	4	—
			215	3 10	7 0	—	—	2	22
			216	3 10	6 0	—	8	21	24

* Signifies hen was still laying at close of competition.

† Died, replaced 12th February, 1913.

‡ Died, replaced 1st March, 1913.

continued.

Laid.							Total per Hen.	Value per Hen.	Untrapped Eggs.	Total Eggs from Pen.	Total Value of Eggs from Pen.	No. of times Broody.
Feb.	Mar.	April.	May.	June.	July.	Aug.		s. d.				
14	23	16	14	10	12	10	151*	14 7½				3
18	16	8	8	4	10	—	85	7 8½				4
13	8	14	9	3	3	8	64	5 6				5
19	17	19	18	9	4	11	102*	8 2½				1
20	15	10	10	9	11	9	103*	9 1		£ s. d.		4
1	19	14	11	13	10	4	92*	7 9½		597	2 12 11	6
20	22	15	—	9	11	3	111*	10 8½				
5	20	22	19	16	18	14	127	10 6½				
6	3	6	4	4	3	—	29	2 4½				
14	15	13	9	15	0	4	105	9 7½	2			
14	21	10	6	16	12	4	107*	9 9		£ s. d.		
9	19	18	6	14	7	—	104	9 7½		585	2 12 9½	
10	19	22	18	8	8	1	87	6 4½				
—	3	5	3	5	2	—	18	1 3½				
13	20	18	19	17	14	—	104	8 1	65			
4	20	22	20	11	8	3	89*	6 9½				
20	21	13	13	10	7	4	104	8 6½		£ s. d.		4
8	15	13	11	5	3	14	84	7 6½		551	2 5 4½	3
—	20	19	2	14	15	4	91*	7 9½				
11	17	13	8	1	—	—	39	2 9½				
16	20	14	11	11	8	7	101	8 11½	29			
8	19	12	13	8	12	1	98	8 6½		£ s. d.		
—	17	17	8	—	7	3	60	4 8½		419	1 16 0½	
—	1	—	—	—	—	—	1	— ¾	—			
13	—	—	—	—	—	—	56	6 8½	—			
—	—	—	—	—	—	—	—	—	—			
11	1	—	—	—	—	—	12	1 0½	—			
—	—	—	—	—	—	—	10	1 4½	—			
19	1	—	—	—	—	—	44	4 7	—	£ s. d.		
17	2	—	—	—	—	—	72	8 4½	—	194	1 2 1½	

§ Died 17th December, 1912.

|| Died 7th January, 1913.

¶ Pen removed from Competition, 3rd March, 1913.

TABLE II.—SHOWING TOTAL WEIGHT OF EGGS OBTAINED FROM EACH PEN OF BIRDS.

No. of Pen.	Order of Merit.	Breed.	Total weight of eggs from 1st Oct. until 31st Aug.	
			lbs.	ozs.
53	Not competing.	Rhode Island Red (Munster Institute, Cork)	148	9.44
15	1	Buff Orpington (Mrs. Cormack, Ballykerrin, Ballincurry, Thurles)	132	10.50
31	2	White Wyandotte (Lady Dunleath, Ballywalter Park, Co. Down)	131	10.00
44	3	Red Sussex (Mrs. Byrne, Garryduff House, Gowran, Co. Kilkenny)	122	3.19
52	4	Rhode Island Red (Ulster Dairy School, Cookstown, Co. Tyrone)	121	14.25
12	5	Buff Orpington (Mrs. Earl, Broughillstown House, Rathvilly, Co. Carlow)	119	10.94
34	6	White Wyandotte (Mrs. Byrne, Garryduff House, Gowran)	116	1.81
8	7	Brown Leghorn (Miss M. Connolly, Derrygowna, Newtowncashel)	115	15.50
50	8	Rhode Island Red (Miss K. Farrell, Loughill, Longford)	114	15.00
47	9	Rhode Island Red (Antrim Agricultural School, Greenmount)	111	5.69
37	10	White Wyandotte (Miss Welsh, The Chalet, Nenagh)	110	3.06
6	11	White Leghorn (Mrs. M'Ghee, Trenamullen, Stranorlar)	105	10.63
42	12	Salmon Faverolle	105	9.31
23	13	Barred Rock	104	13.25
48	14	Rhode Island Red	103	13.56
20	15	Barred Rock	103	13.50
51	16	Rhode Island Red	103	7.06
1	17	Black Minorca	103	2.88
36	18	White Wyandotte	100	1.50
14	19	Buff Orpington	98	13.56
39	20	White Wyandotte	98	6.25
32	21	Do.	98	1.19
33	22	Do.	97	5.00
7	23	Brown Leghorn	97	3.19
11	24	Buff Orpington	96	7.25
28	25	White Wyandotte	95	15.44
17	26	White Orpington	95	5.13
9	27	Brown Leghorn	95	4.81
19	28	White Orpington	95	0.25
24	29	Barred Rock	94	8.44
29	30	White Wyandotte	94	0.88
3	31	White Leghorn	93	10.44
38	32	White Wyandotte	93	10.44
16	33	White Orpington	91	10.38
18	34	Do.	90	5.81
49	35	Rhode Island Red	88	14.19
13	36	Buff Orpington	88	12.94
46	37	Light Sussex	88	12.50
4	38	White Leghorn	87	6.38
10	39	Brown Leghorn	86	13.50
26	40	Barred Rock	86	12.69
35	41	White Wyandotte	86	8.75
43	42	Red Sussex	86	3.94
21	43	Barred Rock	84	3.00
30	44	White Wyandotte	83	15.75
40	45	Salmon Faverolle	83	12.63
5	46	White Leghorn	82	9.19
45	47	Red Sussex	82	2.13
2	48	White Leghorn	81	4.44
22	49	Barred Rock	76	7.00
27	50	Do.	71	7.56
41	51	Salmon Faverolle	57	3.63
25	52	Barred Rock	24	14.63

FARMWOMEN'S INSTITUTES IN AMERICA.*

What are known as Farmwomen's Institutes in America are typical of a movement now making remarkable progress in every part of the world, a movement which has for its object the organisation of women in rural districts for the purpose of providing them with specialised training suitable to the conditions of their life and work, and which has produced, for example, the *Cercles de fermières* in Belgium† and France, the *Landfrauenvereine* in Germany, and the "United Irishwomen" in Ireland. These various organisations have sprung up in response to an almost simultaneous demand, and they are gradually bringing their influence to bear upon rural life in every civilised country. The "Institute" of Canada and the United States may be taken as, in some sort, the prototype of all the others, and as such it has a special interest to the student of rural sociology.

One of the most striking features of secondary agricultural instruction in America is the growth and development of what is known as the "extension work" of the various agricultural colleges and other educational institutions of the kind. This side of their work is of a non-academic character; it is done largely outside the institution, and its aim is to educate the people on their own ground; to bring to the farmer, on his farm, the latest and most authoritative information upon technical matters connected with his profession. This is done in various ways: by the organisation of lectures and courses of instruction, by itinerant schools, by summer schools, by rural libraries, by boys' and girls' clubs, and by many other forms of educational activity. For all these there seems to be a ready welcome in rural America; in the words of a recent official report: "the awakening of country people to the need of agricultural instruction and to the possibilities of extension teaching has created a demand for this instruction far beyond the power of the States to supply."

One way in which it is sought to supply that demand is by organising winter courses of lectures, to which has been given the rather curious title of Farmers' Institutes. As the Farmwomen's Institutes are a direct outgrowth of these, and are modelled upon practically identical lines, it will be well to be clear, first of all, as to the rise and scope of the men's organisations.

The Farmers' Institutes movement is only in part connected with the agricultural colleges. In about half the States the institutes are

Farmers' Institutes.	under governmental control, and in the other half mostly under college control. The institute may thus be administered directly under Government auspices, or it may be in the hands of some
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* See also NOTES AND MEMORANDA, p. 167.

† See JOURNAL, Vol. XI., No. 4, p. 639.

educational institution. If under the former, it may be in charge of a State Department of Agriculture or of a State official, or, again, it may be worked by county organisations or rural societies which are in receipt of State or Provincial bounties. As now understood, the movement is a product of the past twenty-five or thirty years, but its actual beginnings were more remote and are somewhat obscure. It first took its rise out of the agricultural societies and State boards of agriculture, and later on an independent movement came from what are known as the Land-Grant Colleges. The earliest instructional courses of the kind were held in Massachusetts; other States gradually took up the idea, and now practically all of them are provided with Farmers' Institutes of some kind. The extent of the movement may be gathered from the fact that the institute attendance registered in 1911 numbered 2,291,857. In that year 5,889 institutes were held, comprising 16,741 sessions, at each of which the average attendance was 138. The grants allocated for institute purposes by the State legislatures amounted to something like £76,641, and the total amount from all sources expended upon institute work was £90,144. The teaching staff comprises over 1,000 lecturers employed by the States, and, in addition, fully three times that number of local lecturers and speakers.

The function of the institutes is to carry education to the rural community; it is a phase of extension work which deals less with individual men on their farms than with small communities or groups of men. It falls, therefore, into two main categories—instruction in technical agriculture and the developing of a community sense, and these two standpoints are kept in view when arranging the programme of instruction, whether it be in the form of lectures, or of object-teaching, or of itinerant schools.

Before passing on to describe the Women's Institutes, a few words on the subject of the attitude of the Federal Government towards the institute movement as a whole

State	may be useful. So much importance does the
Action.	Government attach to the movement that a

special division of the Office of Experiment Stations was created in 1903, under the direction of a farmers' institute specialist, whose duty it is to "investigate and report upon the organisation and progress of Farmers' Institutes in foreign countries, with special suggestions of plans and methods for making such organisations more effective for the dissemination of the results of the Department of Agriculture and the Experiment Stations, and of improved methods of agricultural practice." This Government office also issues bulletins of information, collects and publishes laws under which institutes are held in the various States and secures lists of names of State directors, lecturers and local

managers of Farmers' Institutes. It also prepares courses of study and compiles and publishes illustrated lectures suitable for delivery in institutes. The nature and scope of these lectures may be judged by the following specimen titles: Care of milk—Potato diseases—Silage and silo construction for the South—Tobacco-growing—Wheat culture—Farm-homes—Production and marketing of eggs and poultry.

Another organisation which aims at furthering the institute movement, and which works in direct collaboration with the Government office already described, is the American Association of Farmers' Institute Workers. To its last annual meeting, the sixteenth, delegates were sent from 40 States and from 3 Canadian Provinces. At that meeting the delegates present represented an attendance at institute instruction during the year of no less than 4 millions of people. A great number of matters connected with institute work were dealt with by the meeting, and it is worth while to quote the summarised statement of the reports handed in by the various standing committees, as they exhibit the nature and progress of the movement and, as it were, give a sort of bird's eye view of its present position. The reports were to the following effect:—

(1) That an efficient, permanent, local institute organisation in each county is essential to the best conduct of the work.

(2) That lecturers equipped with practical experience as well as scientific knowledge are most appreciated and accomplish the best results.

(3) That the institute is the field agent for the spread of information which other organisations wish to have the public to understand and to put into practice. Consequently, the institute is under obligation to co-operate with all other agricultural institutions and societies that it may serve them most efficiently.

(4) That the movable school of agriculture is no longer an experiment, but a method of education to be generally adopted and extended.

(5) That institutes for young people, particularly those between the ages of 14 and 18, are recommended to all institute directors for organisation, and

(6) That institutes for women have been successful wherever tried and that they should be established in all the States upon equality with those organised for men, both in regard to financial support and lecture service.

And so we come to the woman's side of this great movement towards agricultural efficiency and the betterment of rural conditions. As so frequently happens in movements of the kind, the woman's point of view was, at the outset, completely ignored. Or rather, it was not realised that she had, or might have, a distinct point of view,

and one that it would not be well for the general good of the community to neglect. In any case, the Farmers' Institutes were mainly concerned with subjects belonging more specifically to the man's department of agricultural activity. Here, again, it was not at first realised how far the man's and the woman's interests really coincide and how efficiency in the one case alone is but a poor substitute for efficiency all round. This is especially true of farm work; the interrelation of the various sections of work on a farm is very subtle and delicate, and ignorance or inefficiency in one branch quickly reacts upon all the others.

Although at first the institutes made no special provision for dealing with matters belonging more particularly to woman's work on the farm, no bar was set to the attendance of women at the various sessions. They were not slow to avail themselves freely of the implied permission, and from an early date in the history of the movement many sessions of the Farmers' Institutes were followed with the keenest interest by a large and growing number of women. Later on, when the importance of studying, from the woman's standpoint, problems which specially concern woman's work was realised, separate Women's Institutes began to be organised. The good effects of this step were at once apparent; a better distribution of work was possible and specialised aspects of rural life could be discussed in detail, the interest of the women was enormously increased, and in their special meetings they were encouraged to a freer interchange of ideas, with the result that the value of their contribution towards the solution of rural problems was considerably enhanced.

Minnesota and Wisconsin were the first States to organise special house-craft sessions in connection with the meetings of their Farmers' Institutes. Now these are held in almost every State in the Union. Furthermore, special Women's Institutes, entirely distinct from those of the men, have been organised in a number of places. The report for 1911 states that in that year institutes of the kind were held in 14 States. They comprised 577 sessions and had a total attendance of 47,962. The report goes on to say that "whenever opportunity was afforded and proper attention given to the development of the work, Women's Institutes have been organised, and wherever they have been organised they have been well attended and the effort appreciated. . . . The claim of some directors that countrywomen in their States are not desirous of separate institutes is groundless, for wherever they have been thoroughly tried they have succeeded. . . . Their success is no longer problematical, and State directors who have not yet organised institutes of this character are missing an opportunity for usefulness that seldom comes to a public official."

The object of the Women's Institutes is to give to the rural woman that knowledge which will fit her to cope successfully with the various problems which meet her in rural life. The institute instruction, therefore, considers her in her various capacities as a member of the agricultural community. As a mother, she must deal with the problem of education and must be familiar with the laws of health, as a housewife she must deal with the manifold aspects of domestic economy—cookery, sewing, laundry-work, and all the other arts which go to make the home comfortable and healthy—and finally, as a direct worker in the domain of agriculture, she must be provided with the technical knowledge required for poultry-keeping, gardening and the various other branches of outdoor work which usually fall to the housewife's care.

Though the Women's Institutes vary somewhat in different States, most of them are modelled on the Farmers' Institutes, and indeed form part of the latter. That is to say,

United States. the women's branch is founded, as it were, under the patronage and with the support of the older organisation. The meetings of men and women are usually held at the same time, but in separate halls, and at the women's meetings subjects of particular interest to women are dealt with. Thus the special feature of these organisations is that they work conjointly with those of the men, a reasonable arrangement, after all, since the ultimate object of both is identical, namely, the betterment of the conditions of rural life.

The Illinois Women's Institutes, for example, which were first organised in 1898, follow the general lines of the men's institutes and are co-ordinated with the latter. The women undertake the general direction of their own branch, but its business administration is in the hands of the men's institutes which have voluntarily undertaken this work. The system followed in Illinois is not exactly typical of all the other States because, as already stated, there are many local differences. In Illinois there is a central body known as the "Illinois State Association of Domestic Science," to which are affiliated a number of local county associations which are entrusted with the actual "demonstration work." The object of the central organisation is to stimulate interest in all that concerns the home, to encourage the formation of similar associations, to co-ordinate their labours and to work for the inclusion of domestic science in the national system of education. It is composed of delegates from the various domestic science associations, whether these are dependent or not upon the Farmers' Institutes; each local society is entitled to send two delegates to the meetings of the central body. A president and officers are elected and an annual meeting is held, simultaneously with the meeting of the Illinois Farmers' Institutes.

The object of the local associations is to improve the conditions prevailing in rural homes by the following means : (1) Preparation of better and more hygienic food, (2) the practice of domestic hygiene, especially from the point of view of the prevention of disease, (3) the construction and arrangement of the house in as comfortable and attractive a manner as possible, (4) the arrangement of the kitchen, its furniture and utensils, (5) the study of the principles of sound domestic science with a view to lightening the labour of housework, and (6) the instruction of young people in the principles of that science. The association is managed by a committee and officers, who prepare the programme to be dealt with in meetings. Members must be over 14 years of age and must pay an annual subscription of 25 cents. If the amount realised by these subscriptions be insufficient to carry on the work of the society, an additional supplement may be levied. Members are liable to a fine of 5 cents for non-attendance at meetings.

The general object aimed at by both the men's and the women's institutes has already been indicated ; the benefits derived from them have been already great. Besides instruction directly given, they have contributed to the formation of libraries, to the organisation of agricultural shows, the improvement of schools and public roads, the foundation and maintenance of hospitals and the stamping out of tuberculosis. The institutes are, in fact, the main arteries through which the stream of agricultural and economic instruction is enabled to reach the utmost recesses of rural America.

Turning to Canada, we find that the history of the development of the Farmwomen's Institutes there has many features in common with that of the same movement in the States. The

Canada. Farmers' Institutes movement in Canada is provincial ; each province has its own system, which is in charge of a Government Superintendent. The work of the institutes extends to all branches of rural life, and meetings are held chiefly in the winter months, when work is slackest.

The need for some corresponding provision for the women was early felt and was at first met by attaching to the staffs of Farmers' Institutes a woman lecturer, who discussed various household topics and so attracted a large attendance of women to the meetings. This arrangement soon proved inadequate, with the result that many Women's Institutes were started on similar lines to those of the men's. The movement was generously fostered by the Canadian Government, and several provinces have been active in the organisation of Farmwomen's Institutes.

In Ontario especially the history of the movement has been very remarkable. That province has to-day the most highly-developed system of Farmwomen's Institutes in the whole world,

and it has more or less served as a model to other countries who have sought to follow its example in making provision for the training of their rural women. The district institutes in Ontario now number 92 ; these comprise no less than 750 branches with a membership of over 23,000. The field of activity of these institutes is very wide, as is suggested by their motto, "For Home and Country." In the words of Mr. Putnam,

Ontario Superintendent of Institutes, the organisation,
Institutes. if it has done nothing else, "has taken the woman beyond, but not above, those things which concern the everyday routine of the home. Due prominence has always been given to those duties and responsibilities which come to every woman who is responsible for the well-being of a household. At the same time the lives of the members have been broadened and their attention directed to education, life problems, community interests, home and public hygiene, water supply, civic improvement, care and education of the defective, etc., etc."

Institutes may be organised wherever a number of interested women are to be found, but only those which secure a membership of 15 or upwards within the first year of organisation are recognised by the Provincial Department of Agriculture. When more than two are formed in an electoral district, a central or district institute is established to which the branches send delegates and through which they make their wants known to the Department of Agriculture. This Department contributes from 7,000 to 8,000 dollars annually towards the maintenance of the institutes, which are, however, also supported by grants from agricultural societies and by the subscription of 25 cents which is collected annually from every member. As a rule, each Women's Institute is affiliated to a Men's Institute. It is managed by a board consisting of a president, a vice-president, a secretary and one or more members. In most cases these offices are honorary. The board direct the work of the institute and are eligible for re-election every year. Further, two commissioners are appointed annually to examine and audit the accounts. The secretary prepares a detailed report and statement of accounts for the annual meeting. This meeting prepares the programme of study for the next session and discusses the best means of furthering the work of the association.

Most of the institutes hold meetings every month. Speakers are supplied by the Department of Agriculture for one or two of these, but the institutes are obliged to hold at least four meetings every year at which they supply their own speakers. In this way the Department seek to bring out and utilise local talent, and their efforts in that direction have been amply rewarded, for many admirable papers and addresses are to be found in the records of the Women's Institutes. Thus the institutes form a healthy antidote

to the dullness of rural life ; they help their members to throw off that burden of mingled lethargy and timidity which only too often prevents rural women, and men too, from coming together and freely discussing their problems and difficulties. In some institutes it is the practice to have a box or drawer into which members who are too shy to ask aloud for the information they require can drop their written questions. These questions are placed on the agenda for the next session and are dealt with by members competent to do so.

The institutes recognise no distinction of creed or class ; they welcome all serious-minded women who are interested in the ideal for which the movement stands. Every woman with something good to say or to give to others gets her opportunity in the institute, and some very remarkable talent has been brought to light in this way, talent that would perhaps otherwise have lain dormant and therefore useless to the community. The women of the institutes are all working-women, who have to face the realities of life day by day and are keenly alive to the necessity for fitting themselves for their task as thoroughly as may be. The keynote of the institutes is therefore thoroughness and efficiency. But these are not cultivated at the expense of other equally important qualities, and there is a strong tincture of very human, homely sentiment in these strenuous people, who are only anxious to do their best "for home and country" without making any undue fuss about it. Mr. Putnam voices the outlook of the institutes when he says, "We are not and have not been concerned that our organisation shall secure publicity by doing that which is sensational and done for the purpose of attracting public attention. We do not aim to do that which will give the society notoriety, but our desire is to make the life of the lonely and isolated brighter, to spread the gospel of right living, physically and morally, which we are pleased to know exists so largely among Canadians, and to attract and secure the co-operation of the increasing number of those in our towns and villages who are inclined to magnify society life. The Institute deals with the vital things of life and leaves formalities to the care of others. Our desire should be to deal with the everyday needs of our people in such a way that the life of each will be made more perfect."

The Canadian Department of Agriculture issue a very practical Handbook containing instructions on the methods of organisation, directions for conducting meetings, definitions of the powers of the various officers and suggestions as to lines of work or topics to be discussed at meetings. This Handbook is widely circulated throughout the province, and, while leaving each institute full liberty of the choice of subjects, it serves to give cohesion and a certain degree of uniformity to the whole movement.

Besides the Handbook, Mr. Putnam's Department issue Annual Reports which are eloquent records of the fine work accomplished by the Ontario Institutes and of their aspirations and plans for the future. Every year the institutes come together for an Annual Convention, when addresses are delivered and papers read by members and also by outsiders, who are called in because of their special qualifications in some line or other. These papers and addresses are published in the first part of the Annual Report, and very interesting reading they make. At last year's Convention, held in Toronto, the following subjects, amongst others, were dealt with: What one Institute is doing—Electricity on the farm and in the house—Young women and the twentieth century—What can we do for the boys? My child's future—St. John's Ambulance Association—The school and its relation to the community—Water supply in country and village homes—Our dumb animals—Eyesight and how to care for it—The bed and bed-making—The value of cheese in diet—The culture of winter and spring flowering bulbs—The baby on the farm—Medical inspection in rural schools—Rural school-houses and their equipment—Hygiene for rural schools.

The second part of the Report is also very interesting; it contains announcements of summer lectures, which run from the last week in May to early in July, and also a list of the lecturers sent out by the Department of Agriculture to help the various institutes. This list is a kind of institute "Who's Who," containing short biographical notes of the lecturers as well as the subjects with which they intend to deal. For example, division No. 3 is a large one; it embraces five counties, where there are no less than 37 institutes. To this are allotted two official speakers, Miss Hughes and Miss Guest, who begin work on May 27th and finish on July 8th, working every day but Sunday. Turning to the list of speakers, we find that "Miss Hughes is a graduate in domestic science and domestic art. Her experience in hospital work and familiarity with both country and city conditions and requirements give her a fund of information much appreciated by the Institute members. She has devoted several months to demonstration-lecture courses in sewing and cooking to groups of institutes." Her subjects are:—

- Domestic art and what it means to women.
- Teaching children to sew.
- Our clothes, their selection and making.
- The profession of home making.
- Demonstrations on bandaging.
- Our homes; and
- The interests of the homestead.

Her companion, Miss Guest, "has had practical experience in a

farm household and is a specialist and M.A. from Toronto University." She deals with quite a different set of subjects :—

A square deal for the girl on the farm.

Money earning and money spending as a factor in character building.

Helping our boys and girls to find a niche in life.

The mother: what she owes to herself, the home, and the community; and

The unseen background of life.

These are only two instances, but they give us a hint of the scope and aims of the instruction provided in the Women's Institutes of Ontario. We have seen how, since their inception, that scope has been greatly widened; whilst continuing to devote a fair proportion of their time and efforts to household topics, they have widened their field of study so as to include what may be termed "community problems." For instance, increased attention has been given to civic improvement: "towns and villages have been cleaned up, trees planted, walks improved, streets lighted and encouragement given to the private individual to keep his place, as well as the street in front of his place, in a tidy, attractive manner." In the current year it is proposed to deal with the following subjects: Household conveniences and labour-saving devices—House planning and remodelling—Water supply, and disposal of waste for town and country houses—St. John's Ambulance work. These and other technical matters are often treated by outsiders and a pleasant feature of the institute work is the readiness with which officials and professional and business men and women—lawyers, doctors, dentists, bankers, merchants, butchers—have come forward to place their expert knowledge at the disposal of the women, by giving addresses and demonstrations.

The Women's Institute movement in Ontario comprises in its ranks both town people and people from the rural districts, represents the largest body of organised women in the province to-day. One of its most admirable features is that it has always sought to foster feelings of sympathy and appreciation between town and country, showing how the two are largely interdependent and that each has something to give to and learn from the other. It has shown how much may be accomplished when mistaken antagonisms have been sunk and when the best faculties of both are put forth for the common good of all.

L. S.

PROFITABLE TREES.

An Address delivered by MR. AUGUSTINE HENRY, M.A., F.L.S., M.R.I.A., Professor of Forestry, Royal College of Science, Dublin, before the Irish Forestry Society on Wednesday, 16th October, 1913.

Trees are planted for profit, for shelter, and for ornament. The profitable trees are those capable of producing timber, by the sale of which adequate return will be obtained for the expenses incurred in planting, and upkeep, and for the rent of the land till the timber is ready for felling. On the wise choice of trees for planting depends the continued success of the afforestation movement. In a country like Ireland, exposed more than any other in Europe, to persistent strong winds, which have an injurious effect both on pasture and agricultural land, the choice of suitable trees for shelter is also a weighty question. Purely ornamental trees to improve the amenities of the landscape, and to give continuous pleasure to the people, have also a claim on attention.

It is mainly however with the profitable species that it is intended to deal now. A profitable tree is one that is ripe for felling at an early age and which also gives early thinnings. An example will show this. Assuming 3 per cent. compound interest, £10 obtained from the sale of the thinnings of a larch plantation 20 years hence is worth to-day £5 10s. 0d. £100 yielded by the sale of mature oak at 100 years from now is worth to-day only £5 4s. 0d.

On the value of timber in the future we can only speculate ; but it is safe to assume that timbers with special uses will considerably increase in price once the demand exceeds the supply ; and for this reason, ash in Europe and hickory in America should be planted extensively. Ordinary coniferous timber will probably always be used, and command a fair price ; but in making our financial calculations, it is unsafe to speculate on any great increase in the price of this class of timber.

The native trees of Ireland are few, and have long since been supplemented by exotic kinds, some of which much surpass the former in vigour and utility. The indigenous trees are of course adapted to the soils and climates where they have grown for ages ; but they are by no means the best that can be found. The

**The Irish
Climate.**

notable success of many exotic species is due to the nature of our climate. The mildness, humidity and cloudiness, generally characteristic of Ireland, are favourable to tree-growth. The prevalence of untimely frosts and strong winds are the opposing factors to be reckoned with. The mildness is extraordinary. Kerry

and Cork have the same January temperature as the Riviera. In the greater part of the south and west of Ireland the mean January temperature is as high as that of the south and west of France.

In consequence of this mildness of climate,* Mediterranean trees like the Spanish chestnut, Evergreen oak, Corsican and Maritime pines, are at home in Ireland. The Corsican pine is in fact much more suitable to our climate than the native pine. This last, as is shown by its constant occurrence in peat-bogs at varying depths, was the prevailing tree over large districts from the close of the glacial epoch to the bronze age; and it lingered in the mountains of Kerry and in a few wild spots of Connemara till the end of the eighteenth century. The beech and hornbeam were im-

**Exotic trees
in Ireland.**

ported from the south and east of England early in the eighteenth century. From the mountains of Central Europe we obtained, about the same period, valuable conifers like the common larch, spruce, and silver fir, followed in the nineteenth century by others like the Corsican and Austrian pines and the Servian spruce. From Japan only one introduction, *Larix leptolepis*, has been of economic importance. None of the Himalayan, Chinese or Siberian trees promise ever to be of the slightest value in our work of re-afforestation. This is easily explained. Continental Asia in the temperate zone with its extremes of climate, characterized by intense cold in winter, great heat in summer, and definite abrupt changes from spring to summer and from autumn to winter, and with a total absence of late and early frosts, is totally unlike our island. The same climatic difference holds good for the Rocky Mountains and the vast territory eastward of this range in North America. The Weymouth pine, the only conifer from this region which made rapid growth and good volume of timber in the British Isles, is now useless on account of its liability to disease.

The White spruce (*Picea alba*) of Canada thrives on poor soil in exposed situations at a high altitude in the mountains of Scotland and North England; but it is slow in growth, and always remains a small tree, useless for timber production in these islands. Some of the broad-leaf species of New England and Canada, as the Red oak (*Quercus rubra*) and Tulip tree (*Liriodendron tulipifera*) succeed in the South of Ireland as ornamental trees, but are of no economic value.

The contrast in climate of the different regions of North America and of Western Europe is well shown in the following Table† :—

* All the trees and shrubs which flourish in the nurseries at Pallanza in North Italy can be grown in many parts of Ireland.

† Extracted from Mr. Storm's article in *Hedeseelskabets Tidsskrift*, No. 3, p. 38. (1913).

	Lat.	Mean Temp.		Mean of the yearly extreme temp.		Difference between highest and lowest temp.	Rainfall.		Relative Humidity	
		April-June	Annual	Max.	Min.		April-June	Annual	April-June	Annual
<i>West Europe.—</i>										
Faroe	62	47°	44°	64°	15½°	48½°	In. 14	In. 64	82	82
Bergen	61	51°	44½°	78°	13½°	64½°	18	80	74	79
Glasgow	56	53°	48°	80°	13½°	66½°	10	36	77	82
<i>North America.—</i>										
(1) <i>Pacific Coast.</i>										
Port Simpson	54	50°	45°	77°	8°	69°	20	92	87	88
Seattle	47	56½°	51°	90°	21°	69°	7½	37	67	75
San Francisco	38	56°	55°	92°	37°	55°	3	23	79	79
(2) <i>Mid-Continental</i>										
Banff	51	47°	35°	87½°	—36°	123½°	10	22	65	71
Helena	46	55°	43°	95°	—22°	117°	6	13	50	54
Winnipeg	50	54°	33½°	93°	—42°	135°	9	20	71	79
(3) <i>Atlantic Coast.</i>										
Belle Isle	52	39°	31½°	66°	—20°	86°	14	38	—	—
Eastport	45	50°	41°	86°	—12°	98°	14	44	78	77

The Pacific Coast region of N. America has provided us with a set of most valuable conifers. This region has a climate singularly like that of the extreme west of Europe, Alaska corresponding roughly to Norway, British Columbia to Scotland, Washington to Ireland, Oregon to Western France, and California to Portugal. This N. American region possesses the greatest coniferous forest in the world, remarkable for the astounding height and girth of the trees and the amazing volume of the timber which they yield. In these respects the Pacific Coast trees are unique; and it is singularly fortunate that when introduced into the congenial climate of this country, they preserve their extraordinary vigour.

Some of these great trees, as the Douglas fir and the Sitka spruce, are distributed over an immense area; and on that account require special study. It is well-known how superior in vigour is the Douglas fir growing close to the coast to the same species growing in the mountains far inland. Furthermore, individuals of northern stations are not so vigorous as those of southern stations. All

such differences are doubtless inheritable; and this is of importance in regard to the following point. Very little is known of wind force on the Pacific Coast, but it is believed that trees of immense size occur in localities where the winds are as constant and as strong as in Ireland; and if this is the case seeds of such trees would be specially valuable. It might be worth while to establish, with the aid of the Governments of British Columbia and Washington State, seed-collecting stations under the supervision of a trained forester. The localities, where vigour and good form of the different trees exist with considerable exposure to wind, would serve as collecting grounds for the seed to be used in raising plants for similar stations in Ireland, and also in Scotland and Wales.

Conifers are chosen in the main for new plantations, on account of the ease with which they can be raised and planted, and because as a rule they yield early returns. Inasmuch, however, as vast continuous masses of conifers are specially liable to injury from insects, fungi, fire, and gales, it is advisable to set aside a considerable area of each new plantation for broad-leaved trees in suitable groups or belts. Existing broad-leaved woods should for a similar reason be maintained in part. Beech will be mainly employed; but chestnut, ash, sycamore, alder, etc., will often constitute a considerable proportion of the broad-leaved belts and groups. The influence of these is manifold. Judiciously distributed, they act as windbreaks; they are inhabited by birds which prey upon noxious insects; and the humus due to their decaying leaves brings health and vigour to the coniferous tracts.

We may now consider some of the real or imaginary difficulties in the employment of exotic trees. Some of the more valuable were formerly difficult to obtain, as the supply of seed was irregular, and young plants were sold by nurserymen at prohibitive prices. This is no longer the case with any of the really useful species. Other valuable kinds are not easy to transplant, and on that account are often rejected by foresters. Such difficulties might be overcome by assiduous experimental work in the best methods of raising these species in the nurseries. Lastly, some valuable trees are tender in youth, when planted out in low-lying frosty situations. This may be obviated by partially planting the ground beforehand with hardy species like the Scots pine, birch, or grey alder.

The profitable species may now be briefly dealt with. European larch still retains pre-eminence as a suitable tree in general mixtures, on account of its early thinnings; but it should never be planted in a pure crop, except perhaps on hill-sides where the soil is specially

favourable. It is still a moot question whether the Japanese larch will develop into a fine timber tree ; and in the last two dry seasons it has suffered much from drought and died in great numbers in England. The Occidental larch, the seed of which I introduced in 1908, is the finest of all larches, attaining in Montana, Idaho and British Columbia 160 feet in height and about 15 to 20 feet in girth. It has done well in certain localities, but in others it is inferior to the European larch. As reports have not as yet been received from the numerous places, to which seeds were sent, it is not now necessary to discuss the merits of the western larch.

The Douglas fir is being largely planted in Ireland. It suffers

The Douglas Fir.

from the wind, it is true, in exposed situations, but dense stands show little reduction in the volume of timber from this cause. The effect of the wind is to diminish height growth, and to bare the leading shoots of branchlets and foliage on the exposed side ; yet the stems below, still well furnished with branches, may be increasing in diameter at a good pace. It is however probably safer practice to avoid planting Douglas fir in regions where exposure to the wind is at all severe ; and sheltered situations on low lying land and in valleys should be chosen for it, as it does not succeed at high elevations. It must also be remembered that it does not thrive on wet soils or on soils containing more than 2 per cent. of lime. Recent measurements in Wales show that on a good soil the Douglas fir produces about 200 cubic feet (quarter-girth measurement) per acre per annum. This greatly exceeds what may be expected from larch, which only in exceptional cases produces as much as 100 cubic feet per acre yearly. The timber is very durable, and has 70 per cent. of heart-wood at 50 years old. It has been used in Scotland for gates, fencing-posts, indoor work in houses, railway and pit sleepers ; and has been sold this year at the same price as larch in Somerset. So far the Douglas fir has been fairly free from insect or fungus attacks ; but this immunity may not continue. In July, Mr. A. C. Forbes observed some trees covered with *chermes* in the New Forest, an occurrence not hitherto recorded. This may serve as a warning against extensive pure plantations of Douglas fir ; these should be interspersed with clumps or belts of beech. Douglas fir is also of remarkable utility in what may be called interplanting, that is, in filling up gaps in ordinary woods that happen to be thin and poorly stocked. Such woods should really be clear-felled, but this is often inadvisable for æsthetic reasons. For converting coppice, or coppice with standards, into high forest, this species is invaluable, as it usually thrives on the soils which carry coppice, and in a short time suppresses by its vigorous growth, the coppice shoots. In inclosed parts of the New

Forest, the Douglas fir regenerates itself freely, natural seedlings being found in abundance at long distances from the parent trees.

The common spruce, *Picea excelsa*, is a native of Central Europe, and has been long in use in our plantations, chiefly

Spruce. on account of the ease and cheapness with which it can be raised and transplanted, and because it is very hardy. It has generally, when pure, been planted too wide apart; and has often been used in unsuitable mixtures in low-lying land. Its proper use is to produce a large volume of timber in hilly or mountainous country, for it succeeds at altitudes where Scots pine and larch fail. On the Durris estate in Scotland, at an elevation of 800 feet, it produced 5,600 cubic feet per acre when felled at 60 years old. This works out at about 100 cubic feet per acre per annum. The timber was sold at 5d. per foot, realizing £116 per acre.

The Sitka spruce is now being largely planted in Ireland. It is a native of the Pacific Coast region from Alaska to Northern California, where it grows along the shore and inland for a few miles, ascending even in the far north to 2,000 and 3,000 feet altitude on mountain slopes exposed to the sea. It is unharmed either by the strong west wind or by the sea spray. It attains a gigantic size, rivalling in this respect the Douglas fir, which it equals in rapidity of growth. It grows on poorer and wetter soil than the latter tree, enduring even inundation on the coastal plain. The timber is like white deal, and is now being cut in Alaska and British Columbia for making butter-casks, packing-cases for fruit, wood-pulp, and pianos, as well as in ordinary house and boat building. The climate where it grows is described as "mild and uniform, with heavy rainfall, high humidity, and dense fogs; summers generally mild and winters not severe. The temperature drops to—85° F. towards its northerly limit; while towards the south and along the coast, light frosts occur and temperature falls to zero." With such a history no tree seems better adapted to the worst sites in our afforestation areas; and this is confirmed by the results hitherto obtained with this species in Denmark, Scotland and Ireland. On an exposed moorland at Durris, 750 to 900 feet above sea-level, an extensive area was planted with a mixture of common spruce, Sitka spruce, Scots pine, and larch. At 31 years old the trees of the Sitka spruce average 50 feet in height and 8½ inches in diameter. The tallest common spruce do not exceed 35 feet high, and in parts of the plantation have been completely suppressed by the more vigorous growth of the Sitka spruce. The Scots pine and larch succumbed to the exposure. Mr. Crozier estimates the annual increment of Sitka spruce on suitable soils at 180 cubic feet per acre per annum. The seedlings are delicate and require protection; but after four years old they may be exposed to wind and frost. Sitka spruce is to be selected for planting in wet

soils and in exposed situations. It can be carried up the sides of the mountains in many cases to perhaps 1,200 feet elevation. During the past winter and spring this species, like several other kinds of spruce, was badly attacked by an aphid which killed many trees by completely divesting them of their foliage. The severity of the attack seems to be due to an unprecedentedly mild winter; and its recurrence with ordinary seasons is unlikely.

Of the pines little may be said about the native species, the Scots pine. It is valuable when grown as a dense

Pines. pure crop on poor soils which are at the same time of considerable depth and at no great altitude.

Corsican pine is the most valuable of the genus for this country. The climate of its native home, the mountains of Corsica, is similar to that of Ireland—annual rainfall (including snow) 70 inches; maximum temperature 77° Fahr.; only 79 days in the year with clear blue sky. It grows in Corsica, on poor shallow granite soil. Introduced into the British Isles, it has proved perhaps the healthiest* of any species known; and it is remarkably straight in growth, forming a stem of good shape, comparatively free from knots, even in exposed situations near the sea. It bears snow well, remaining uninjured at Arley Castle when the Scots pines were broken to pieces by a heavy fall of snow. It grows much faster than the Scots pine, and thrives on limestone, clay, and sandy soils. It will succeed on dry and shallow soils which are unsuitable for Douglas fir, and it can be carried to a higher elevation. It may be used freely for shelter belts of all kinds. We have no records of the exact volume of timber produced by any plantation of Corsican pine in these countries. In the New Forest a plot about 3 acres in extent and 50 years old from seed consists of trees 70 feet in height and 1½ feet in diameter. Plots of Scots pine on each side average 40 feet in height and 1 foot in diameter. At Les Barres, in France, the volume of timber produced by the plots of Corsican pine greatly exceeds that of the plots of Scots pine, which are of the same age, about 90 years. We can then safely reckon, for Corsican pine in favourable situations, on an increment of about 100 cubic feet per acre per annum.† With regard to the value of the timber, young poles of Corsican pine are esteemed, on account of their uniform width and length, in the collieries of South Wales. A tree in a mixed conifer plantation at Highclere, which was cut down when 75 years old and sold for £5, measured 102 feet in height, and

* The occurrence at Colesborne of larch canker on Corsican pine recently recorded in Qu. J. Forestry, p. 287 (1913) is unusual, and appears to have been due to circumstances of an exceptional character.

† At Merton, Norfolk, in a mixed conifer plantation, 64 years old, Corsican pine slightly exceeded larch in volume, and was at least double the size of ordinary spruce. The sandy soil here contained a good deal of lime.

156 cubic feet in volume (quarter-girth measurement). The heartwood amounted to about 50 per cent. It is interesting to note that the heartwood alone of this tree had twice as great a volume as the whole (sapwood and heartwood) of a Scots pine 95 years old which had been selected at Woburn as an average tree of this species on first quality soil. The Corsican pine thus appears to compare well with the Scots pine in regard both to the amount of heartwood and to its early formation.

Corsican pine has one drawback, the difficulty often experienced in transplanting it into the field. This difficulty, however, can be met by the use of sandy soil as a seed bed, and by frequent transplanting in the nursery.

The Maritime pine (*Pinus Pinaster*) attains on sandy soil in Norfolk, where it is mixed in old plantations with Scots pine, about the same volume per acre per annum, the timber being slightly inferior. It appears to be the best suited of all the pines for planting in peat. The ancient pine trees of the Irish bogs are often found of considerable size, in situations, which show they actually grew in the peat itself. This has suggested to many the idea of covering extensive tracts of peat-bogs with plantations of trees. Success here will depend on proper drainage of a moderate character, as tree-growth, while impossible in a wet bog, is slow on one that has been rendered too dry. Remarkable experiments have been recently made at Abbeyleix, where an area of 40 acres of an over-cut bog, in which however the peat remaining is 9 feet in depth, has been sown with seeds of *Pinus Pinaster*. The seedlings at 4 years old are dense upon the ground and have attained the astounding height of 4 to 6 feet. The cost of the operation has been trivial, 1s. 6d. for seed and 2s. 6d. for the labour of sowing—about 4s. per acre. A little basic slag applied to each plant in the second year is very beneficial; and this dressing, about 4 cwt. per acre, adds 10s. to the cost per acre. In the Abbeyleix bog, drainage was effected at the time when the overlying peat was cut away for fuel, and the surface is now very friable and quite free from heather, so that the extremely long and vigorous roots of the maritime pine are able to push their way deep into the peat. Other species, as Scots, Corsican and Austrian pines, and Sitka spruce were sown on this bog; but their seedlings are puny in comparison. In the ill-fated Knockboy plantation, where numerous species were tried on peat, *Pinus Pinaster** is one of the very few survivors. This species is not very hardy, and will not thrive in places that are elevated or distant from the sea.

* Mr. H. Thompson states in the *Irish Times*, 22nd October, 1913, that the best clump of maritime pine at Knockboy is in the most exposed position, i.e., facing south-west and about 250 feet above the level. He attributes the success in this particular spot to the fact that the ground was cultivated for one year before being planted. The spot is also naturally well-drained.

Pinus insignis is a native of two or three localities on the coast of California, the most important grove being at Monterey, where the tree grows on the sand dunes on the shore, and inland for five or six miles over the adjoining hilly ranges, which nowhere exceed 400 feet in elevation. The climate is very mild, the thermometer rarely descending below freezing point. On the sea-shore the trees are dwarfed, distorted and broken by the ocean storms; but on the hills there are dense stands with slender trees 100 feet in height. Introduced into other parts of the United States, South Africa, Australia, and New Zealand, this pine has shown fast growth in suitable localities, as it has also done in the milder parts of England and Ireland. This vigour, often an increase of 3 feet annually in height, is kept up on the poorest soils, provided the situation is a mild one close to the sea-coast. It has been rarely planted as a forest tree in the British Isles; but at Killiow, in Cornwall, trees of *Pinus insignis* in a mixed plantation 40 years old are about 8 feet in girth, whilst larch, chestnut and silver fir of the same age are only 3 feet.

Mr. T. W. Adams, of Greendale, New Zealand, has recently written to me the following account of this tree in the South Island of that country, where the conditions of climate are analogous to those of the western half of Ireland: "When first settled, this country was nearly devoid of trees, the soil being covered with coarse grass, on account of the constant severe wind. Larch, spruce and Scots pine were planted in millions, but these trees rarely succeeded except in sheltered spots. On the introduction of *Pinus insignis* it was at once seen that the tree had been found which filled the billet; and in a few years beautiful plantations covered the face of the country." He sends me a photograph of a plantation which was made with seedlings raised from seed in 1872 and planted in 1873 at 9 feet apart. These were cut down in 1912, when 40 years old, and averaged 100 feet to 120 feet in height, and 10 to 12 feet in girth. The timber has plenty of heartwood, and is being used by his son in house-building.

Plantations in suitable parts of Ireland would produce large volumes of coarse timber in a short term of years. *Pinus insignis* however will probably prove more useful for shelter belts near the sea. It has been planted with great success for this purpose by Mr. Dorrien-Smith on Tresco, one of the Scilly Isles, where the violence and constancy of the wind are extreme.

Cupressus macrocarpa grows also at Monterey, but it is even more restricted than *Pinus insignis* as it is confined to the Cypress. two or three miles of the shore near that city, extending inland for only about 300 yards. The outside trees are battered by the storms, and assume peculiar forms,

but those behind have straight stems. This cypress has been planted in many parts of the world mainly as a wind screen and a hedge plant ; and it has the same extremely vigorous growth as *Pinus insignis*. It does not appear to stand so firm against severe wind as the latter tree, which should be preferred in very exposed situations ; but it is apparently more hardy. As the wood of all cypresses is very beautiful and valuable, this tree should be tried on likely sites, for its timber. Planted close it forms clean stems, free from branches to a considerable height, as may be seen in a mixed plantation at Enys, in Cornwall.

The *Lawson Cypress*, a native of South-western Oregon, is remarkable for its freedom from injury by frost, insects, or fungi ; moreover, it bears wind well. It is very cheaply raised from seed, and is easily transplanted. It is not however so fast in growth as the species mentioned above ; and there are no records of its volume as a forest tree in dense plantations. It would however yield valuable timber, if planted closely at the start. It thrives on peat at Abbeyleix and other places in Ireland, and might prove admirable for planting in bogs either pure or introduced by groups into areas which have already been covered by seedlings of maritime pine.

The *Nutka Cypress*, coming from a more northern region, Alaska and British Columbia, is still slower in growth ; but possibly more vigorous trees might be raised by getting seeds from its most southerly stations in Vancouver Island ; and these would be invaluable for shelter in wind-swept regions in the north of Ireland. This tree might also be propagated by cuttings, for hedges around gardens in exposed parts of Donegal, Mayo, etc.

Thuja gigantea, widely spread in the Pacific Coast region from Southern Alaska to Northern California, is as healthy as the Lawson cypress which it surpasses in rapidity of growth, while it is inferior in the quality of its timber. It is said not to resist wind well in Ireland, but it thrives remarkably in plantations at Dartrey in Monaghan, at Powerscourt in Wicklow, and at Derreen in Kerry, where it seeds itself freely on peaty soil. It is unquestionably a valuable species, as has been proved at Benmore in Argyllshire ; but in most situations where it does well, Douglas fir or common larch would be probably more profitable.

The common silver fir, a native of Central Europe, is a remarkably healthy and vigorous tree in Ireland, when it is grown upon deep soils, which are essential to its proper development. It attains then great height, even when exposed to the wind, and would make excellent shelter-belts or screens near the sea, behind which crops

Silver Fir.

of other trees could be easily raised and pasture much improved. There are several Pacific Coast species of silver fir which are even superior in vigour, and of these *Abies grandis* is the most astonishing, as its growth exceeds even that of the Douglas fir. This tree at Avondale is less subject to injury from spring frosts than the common silver fir.

With regard to the great class of broad-leaf trees, I have already alluded to the important rôle of trees like the beech, **Broad-leaved** in mixture, as groups, belts, etc., with conifers. **Trees.** Some of this class have special value as producers of valuable timber in a short term of years ; but I need not in the time now at my disposal do more than insist upon the advisability of planting the native ash and alder in all suitable spots that can be found in our afforestation areas. The most important exotic broad-leaf trees, next to the beech, are the chestnut and sycamore. The latter may be used in some cases in admixture with beech, as it is valuable for rollers in mills, when clean-grown.

The chestnut is a native of the Mediterranean region, and thrives in Ireland wherever a mild climate prevails. It **The Chestnut.** produces timber almost as valuable as the oak in a much shorter period. Unfortunately the timber is often found, when the trees are felled, to be badly shaken, and useless on that account for planking or even posts. This defect appears to be due to the action of sudden severe frost in exceptional winters. It is useless then to rely on this tree except in places where such severe weather never occurs, as in sheltered spots close to the sea in the south of Ireland. The chestnut does best on deep sandy or loamy soils, and may be used as a mixture with larch. It refuses to grow on soil containing lime in any considerable proportion. At Highnam, Gloucester, a plantation of chestnut, on loamy sand, 60 years old, contains 58 trees per acre with a volume of 3,262 cubic feet (quarter-girth measurement). Two of these trees were cut down and sold at 1s. 7d. per cubic foot. At this rate the Highnam chestnut plantation, all the trees of which are supposed to be sound, is worth £258 per acre, a remarkable return in 60 years.

The grey alder, a native of Central Europe and of Scandinavia, will probably prove a useful tree for a special **The Alder.** purpose. It is extremely hardy, and when planted in the most frosty and low-lying situations, grows rapidly, and suppresses the grass. After two or three years, more valuable trees can be safely introduced on the improved soil and under the shelter of the grey alder.

Some of the hybrid poplars produce in 30 to 40 years an enormous volume of low-class timber, which is used in France

The Poplar. and Belgium for making packing cases. These trees are not grown in plantations, but set in rows round pasture or hay fields, the produce of which is not diminished by their light shade. They are very profitable to the peasant proprietors in these countries. Of these poplars, the best varieties are the Black Italian poplar (*Populus serotina*), *Populus robusta*, *Populus regenerata*, and *Populus Eugenei*, all of which can be seen making rapid growth in the Botanic Gardens at Glasnevin, in very shallow soil, and with considerable exposure to wind. In the central plain of Ireland, the Black Italian Poplar appears to be much battered by wind; and the planting of poplars for profit, cannot in this country be anything like so extensive as in France, where there is an absence generally of the severe prevailing wind that is the great enemy to the growth of isolated trees. There may be found, however, many marshy and boggy spots, with some shelter, where the fast-growing hybrid poplars would succeed.

The careful study of the requirements of the valuable trees is the clue to the profitable planting of trees for timber or for shelter in Ireland.

NOTES ON THE IRISH LACE AND CROCHET INDUSTRY.

By MISS ANDERSON, *Inspectress of Home Industries.*

A history of lace-making in Ireland would be both interesting and valuable. Even a summarised view of the industry during the middle of the nineteenth century, such as could be obtained from the records of the Royal Dublin Society, would not be without its use ; but any such survey is outside the province of this paper, which is intended only to give a brief account of the recent aspects of Irish lace making, with some thoughts about the present conditions and the future prospects of this branch of Irish industrial work. In such a summary it is possible only to touch briefly on some salient points, such as the organisation of the industry, the importance of good designs and the effect of foreign competition.

Perhaps the organisation of the lace industry in Ireland in recent years can be best examined by considering the methods of training and work in use during the last **Training of Teachers.** decennium. In the lace-making, as in most other technical industries, much inevitably depends upon the qualifications of the teachers. During the past 12 years the standard of industrial teachers in Ireland has been steadily improved. Until the year 1900, teachers were appointed without any preliminary examination, and often the best local worker was selected to teach and conduct a class ; but soon after 1901 the teaching qualification was raised and persons desirous of conducting classes were required to submit specimens of their work in proof of their qualifications to teach the industry. Somewhat later a further step was taken and candidate teachers had to submit themselves to an examination test. Then, in 1903, Summer Courses of Instruction were established by the Department, and at these teachers were trained in drawing and design as well as in the technique of lace-making. Later still, instruction in business methods and book-keeping was added to the curriculum of the Summer Courses, and the recent opening of the Training School in Enniskillen marks a further advance. Very soon after the establishment of the regular method of training teachers it was realised that versatility in industrial subjects was seldom compatible with efficiency ; and now, instead of training teachers of lace-making and crochet, specialisation has been carried out and the teachers are trained to excel in one subject.

In many lace classes ten or twelve years ago neither attendance register nor account books were in use. Business transactions were often carried out by rule of thumb, and whilst in some cases sales, wages and general expenses might be entered in pass books, in others the class manager prided herself on keeping the accounts "in her head." Of course there were classes where the industry was conducted on good business lines and accounts properly kept, but this was by no means general.

**Organisation
of Classes.**

As regards the methods of class instruction an important change has been carried out. In some counties short courses of instruction were the rule, and it often happened that a teacher conducted classes at four or five different centres in the course of a week. This system has now been abandoned in favour of continued instruction in one or two centres in a county, experience having proved the futility of superficial training in lace making. Further, the greatest number of centres now allocated to a teacher is three. This limitation was necessary not only for the reason just stated but because most of the lace-making classes—other than Needlepoint and Limerick lace-making, which are essentially workroom industries—are found in rural districts sometimes separated by a considerable distance.

It may be pointed out here that the development and improvement of an existing industry has always proved more satisfactory than the introduction of a second variety of work into a district. In most cases a second industry has ended in failure, or has had only a limited measure of success, and has thus proved a disappointment to the teacher and the organiser alike. On the other hand, excellent results have been experienced where an established industry has been systematically developed, especially in cases where there was found local traditional skill.

Another defect of some of the older lace classes was the fact that they were largely composed of school children. This was undesirable for several reasons. On the one hand, the children were inclined to neglect their general education under pretence of learning an industry, and on the other they were too young to perform really good work. The very general disappearance of pupils under 12 years of age from lace classes is a matter for congratulation to all concerned, and it is particularly satisfactory to note that the attendance of young children at night classes is now almost a thing of the past. Indeed, night classes in lace making in rural districts are now happily the exception. Classes at night were subject to many disadvantages. Late hours precluded the attendance of many girls, especially those living at a distance. Thus it is found that a day class serves a much larger area. Economy is also served, as artificial light is not needed for the workroom. Again, the work is bene-

fitted, for work done in the daytime is almost always better than work executed by lamplight, and of course the eyesight of the worker is not so much strained, which is a grave consideration.

As already pointed out, business methods some ten years ago were often very haphazard. A great improvement in this respect has taken place. Accounts are now in most cases carefully kept and invoices and business correspondence filed. Reserve funds too have been established, and it is now recognised that the punctual despatch of orders and the due fulfilment of contracts are of the first importance. The establishment of a reserve fund in particular has very materially improved the position of the lace making industry. By its means, current expenses can be readily met and payments on account can be made for finished work, instead of letting, as was the practice in the past, the worker wait for her money until a sale was effected. There is of course still plenty of room for improvement and development in the lace industry, but it may be fairly claimed that business methods and the work itself have steadily improved during the last few years. This improvement in the lace is particularly true of the Clones Crochet Industry. Many of the ordinary class workers now make better crochet than the teachers did ten years ago, and the progress of the work is also shown by the fact that examples for educational purposes have to be constantly renewed, those in use when they have served their turn, being superseded by finer and more modern examples.

One of the present outstanding needs of the Irish lace making industry is the need of improvement in design. **Design.** There are three chief requirements for good lacemaking—good technique, good shapes accurately proportioned, and artistic and suitable designs. A few words with regard to the last of these necessities seem called for. The artistic side of the lace industry can hardly be exaggerated, for it is by the development of new and suitable designs combined with good technique that foreign and other imitations can be most successfully combated. Foreign copyists and machinery have combined to hackney and cheapen many of the Irish trade patterns, and it is by the development, variation, and improvement, constantly carried out, of patterns that outside competition can be met and successfully checked. This fact has long been recognised by the more advanced centres, and improvements in design have been carried out by many county teachers. Still the point cannot be too much emphasised, and general attention is called to it. Often a slight variation in design is sufficient to impart freshness and interest to a traditional pattern and to lift it beyond the ordinary standard.

It must of course be at once and frankly admitted that lace designing, especially crochet designing, is a difficult task, as both the material and the technique of the work require very careful consideration. It is one thing to draw a design that looks well on paper, but it is quite another matter to make a design that can be translated satisfactorily into lace. It is therefore very desirable that teachers of design should have some practical knowledge of the possibilities and the limitations of lace making, and that these limitations should be clearly recognised. There are many forms, often beautiful in themselves, which are totally unsuited for lace making, and there are many classes of ornament which do not lend themselves satisfactorily—if at all—to the lace maker's craft. For example, Gaelic interlaced ornament is highly effective in illumination, in carving, or in metal work, but it needs relief or colour for its successful development, and it is therefore generally unsuited to the methods of lace making or crochet work. Again, intricate designs composed of serpents, dragons, and strapwork, require much skill, much time, and considerable labour for their rendering into lace or crochet, whilst the results obtained are almost always wholly disproportionate to the labour involved in their production. The same amount of skill and labour bestowed upon a more suitable design would yield in every way far more satisfactory results. The frequent use of Gaelic interlaced design is probably due to the desire for a purely Celtic pattern, but even if these exclusively Celtic patterns are sought the desire might be met by a reference to the earlier school of Irish ornament, in which spirals, groups of circles, and raised curves, all more suitable for the work of the artist in lace and crochet, formed the principal motifs. Many helpful suggestions might be gathered from these early sources and translated into modern design. Closely related to the use of interlaced ornament lies the lavish employment of long stalks and stems in patterns intended for lace work. These long lines are particularly unsuited to the technique of crochet work, although they may sometimes find an effective place in embroidery. Again, even when these long stems are skilfully rendered their effect is rather that of woven tape or braid than of handmade lace, and the appearance is in addition mechanical rather than artistic.

It may be pointed out here that there are often considerations other than those of art or taste that have to be reckoned with. For instance, there is a popular prejudice against the use of birds or other animal forms in designs for lace that is intended for personal wear—an exception is made in favour of butterflies. Of course amateurs can follow their own fancy untrammelled by any consideration for the market, but industrial workers cannot neglect any prejudice which affects the commercial side of the industry.

Balance should be sought rather than symmetry, for freedom adds

to the charm of lace design, and accordingly patterns showing balance of line and mass with variety in the minor details are generally more pleasing than a strictly symmetrical design which has a mechanical effect. It is important to remember too that mechanical effects should be avoided for another reason: they are much more easily copied by machinery.

The student of design should study carefully not only natural forms of art objects but, and even more particularly, fine examples of antique lace, Italian, Flemish, and French. By careful study of fine examples—and there is abundant opportunity for such study in the Irish National Museum—great improvements in modern lace design may be effected.

The Irish crochet industry is subject to wide fluctuations. In the year 1903-4 there was a decline in the demand for Irish raised crochet caused chiefly by the rise of the Austrian crochet industry. This rivalry was for the time being successfully met by Irish workers turning their attention to Clones crochet lace, known in America as "Baby Irish," but although Austrian competition was largely neutralised it was only after a great struggle, and there has been again, during the last year, a serious depression in the Irish crochet market, largely due to competition by continental and Eastern workers. The Austrian Government has systematically promoted the crochet industry in order to provide employment in the poor rural districts which abound in that Empire. Special measures have been taken for training workers and supplying designs. Some account of the efforts made by the Government may be found in *The Studio* for October and November, 1906. Many of the crochet teachers employed appear to have been Irish, and Irish motifs were freely employed in the industry. In addition the marketing of the work was supervised by the Government. Crochet is also largely made in France, and as some of the work is of high quality—although the mesh, or *réseau*, is generally inferior to that of our best workers—the demand for Irish crochet in the Paris market has declined. Crochet is also largely produced on the Continent, in Switzerland, and Italy, but Ireland has to deal not only with continental competition but with cheap oriental work. Crochet is now largely produced in Lebanon, and Syrian crochet has flooded the American market to the serious detriment of the Irish industry. Oriental crochet has indeed even found its way into the Irish market. Nor does competition end here. The crochet industry has been lately introduced into China, Japan, and the Philippine Islands, and in the State of New York many Italian emigrants are chiefly employed in producing "Irish crochet."

In addition to having to face this severe competition, Irish lace is subjected also to very unfair competitive methods.

Thus, Irish designs and motifs are largely employed by both the continental and oriental crochet workers, and unhappily in some cases these characteristics of the lace are made the basis of fraudulent practices both in the European and American markets. Foreign crochet with Irish designs is offered for sale and advertised in trade publications as Irish crochet. Cases of this form of fraud have occurred in London and in various cities on the Continent, and even in Ireland foreign-made crochet has been exposed for sale and sold as Irish. Such frauds occur more especially in tourist resorts. Methods of trading like this exercise, of course, a very injurious effect on the Irish lace and crochet industry. Such frauds are difficult to combat, and so far the only effectual attempt made to check the wholesale frauds on Irish lace manufacturers is through the Irish Trade Mark. This mark has become recognised under the United States Law, and anybody using it to describe goods which are not Irish is liable to penalties. Mr. Walpole Bell, of New York, a well-known importer of Irish lace, stated in the newspaper press some time ago that he used a neat device in the form of a label bearing the Trade Mark on Irish crochet. The device is attached in such a way that once torn off it cannot again be used, and thus the unscrupulous dealer is prevented from making fraudulent use of it.

The question of the adoption of a national trade mark is an important one, calling for serious consideration, and it is to be hoped that some decisive action in this matter may be found possible, as if unfair competition could be satisfactorily dealt with the trade in Irish lace would flourish, as the industry is one which, so long as it obtains a fair field, fears no rivalry.

Besides the handwork imitations of Irish crochet there are the machine-made reproductions which are manufactured in German and Swiss factories. This competition has, of course, to some degree an injurious effect on the Irish crochet trade, as Irish crochet patterns are largely copied and occasional defects are even imitated to give a greater resemblance to handwork. But the rivalry of machine-made goods is not at all as mischievous as that of the hand-made imitations, for machine made crochet will not wear or wash like the genuine fabric, and accordingly it is useless for trimming articles that have to be frequently laundered.

In conclusion, it may be mentioned that the last year has been a favourable one for Irish lace other than crochet. There has been a good demand for Needlepoint, Limerick, and Carrickmacross lace, and there is no evidence of any decline in the demand at the present time.

EARLY POTATO GROWING.

The season of 1918 was much less favourable than the two preceding ones as respects growth, earliness, and yield of crop. Prices, however, were exceedingly good, and, notwithstanding the small crops, very good returns have been procured on well cultivated land. The planting season was favourable. There were no spring frosts, and growth, though slow, was fairly good until the beginning of May. Then ensued a period of cold, wet weather. The plants grew older but scarcely any bigger, and the inevitable result was late raising and a short tonnage. Practically the same conditions, however, obtained everywhere, and Irish potatoes came in quite as much in front of English crops as they have done in earlier seasons.

In County Dublin the unfavourable conditions were very marked on the Skerries coast, and the report from there is that of, on the whole, an unfavourable season, both as respects the potato crop and the succeeding catch crop.

Dublin District. Raising commenced on the 5th of June, and at that time the crop was not much over three tons per acre, but the price then was good enough to make the crop not actually unprofitable. At Rush, conditions were much more favourable, and a very good and fairly early crop was raised. A special feature of the Rush trade this year was the renewed eagerness of English and Scotch buyers to procure consignments from Rush. Their excellent quality is apparently appreciated, and the popularity which "Dublin's" enjoyed forty years ago is returning owing to the universal practice of sprouting in boxes. On the whole, the Rush growers have had a very good season and excellent returns.

At Dungarvan, in County Waterford, a large extent was grown chiefly by small growers in the Ballinacourty District, organised under the Dungarvan Co-operative Agricultural Society. It is a pleasure to see that these growers, now that they are no longer under the direct supervision of a Resident Instructor, continue to maintain their high standard of efficiency. The net return received by thirty-three growers ranged from £20 8s. 0d. per acre to £38 14s. 2d. per acre, and the average over the whole is over £28 per acre. This is extremely good when the value of the catch crop is taken into account, estimated by growers at from £9 to £12 per acre for turnips, and £20 to £25 per acre for broccoli and cabbage. Selecting a few individual cases, one grower received £32 per acre for his potatoes, and estimates his broccoli and cabbage at £20 per acre, making a total of £52 for the season's cropping.

Another received £38 18s. 9d. per acre for his potatoes, and estimates his turnip and cabbage at £13 per acre, making a total of nearly £52. All this is very encouraging, and should lead to some extension of the industry where conditions are undoubtedly extremely favourable.

In County Cork the growers in the neighbourhood of Youghal organised under the Gortroe Co-operative Society, grew an extent similar to former years, and their average net

Youghal revenue over the whole was about £34 per acre.

District. The report of the second crop from this district is not quite so favourable; still the estimate for the crop of broccoli, swedes and white turnips works out an average of £15 per statute acre, making the amount of the two crops the very high average of £49 per acre.

A grower in South Cork has very kindly furnished detailed particulars of his crop, extending to 1 acre 1 rood and 24 poles, statute measurement, as follows :—

EXPENDITURE.

Cost of Seed, 25 cwts. @ 4s.	..	..	£5	0	0
45 Loads Farmyard Manure @ 4s.	..	..	9	0	0
Artificial Manures	..	..	2	16	3
Ploughing, grubbing and harrowing..	..	..	1	10	0
Ploughing and opening drills	..	..	1	0	0
10 men, $\frac{1}{4}$ day each planting	..	..	0	6	11
Closing Drills	..	..	0	2	6
Scuffling twice and earthing up	..	..	0	10	0
Hoeing weeds out, 4 men, 1 day each, @ 2s. 10d.			0	11	4
Digging and picking the crop, 4 men, 8 days each,					
@ 2s. 10d.	..	..	4	10	8
Man and Horse, marketing and selling potatoes,					
6 days, @ 6s.	..	..	1	16	0

£27 3 8

Equal to £19 8s. 10d. per statute acre.

This crop was raised from 23rd June to 10th July, and the total weight of all grades was $7\frac{1}{2}$ tons, which realised the gross amount of £58 7s. 2d.; deducting the charges as shown above of £27 8s. 8d., it leaves a profit on this plot of £31 3s. 6d., equal to £22 5s. 5d. per statute acre of profit. The variety grown in this case was British Queen, which is a second early, and it is remarkable that it should come to market only a week later than the first earlies. The peculiar season, no doubt, accounts for this. This grower estimates that the value of his cabbage and turnips will defray the rent and taxes of the land. This is evidently a very highly farmed piece

of land in capable management, as is shown by the high manuring and efficient tillage, all of which has its reward in the high profit shown. What other industry will give a profit of over cent. per cent.?

In County Sligo, Sir Josslyn Gore-Booth grew a considerably increased acreage at Lissadell. Mr. J. A. Cooper Sligo (Lissadell) of the Estates Offices has, as usual, kindly furnished a report giving complete details as follows :—

“I now beg to send you the following report on the Early Potato growing here for the past season.

Last year (1912) was an exceptionally good season, with excellent results and exceptionally early. We started digging on 30th May, 1912, but this year we were unable to start until 19th June, and speaking generally this year's results have been disappointing.

Our planting this year was done in good time, all being planted in the month of February in good dry weather. Unfortunately that was the only dry weather they had, as the entire spring was exceptionally wet, and that, of course, checked the growth. Some of our heavy land was quite saturated, and the potatoes in sandy soil were nearly as badly off as those in clay soil, suffering much not only from the continual wet, but from want of sunshine. The entire crop of course suffered from the wet and cheerless weather, and the result is shown in our average yield per acre, which is the lowest since 1909.

With regard to varieties, ‘Ninetyfold’ as usual, was the earliest ready with us, ‘Epicure’ was next, whilst ‘Midlothian Early,’ although the earliest planted, was later than either. Failing a new good early potato, our experience here shows that ‘Ninetyfold’ and ‘Epicure’ are the most suitable with us.

The following shows the details of this year's crop :—

Variety.	Area, Statute			Date Planted.	Date Lifted.	Yield.			Average Yield per Statute Acre.		
	A.	R.	P.			T.	C.	Q.	T.	C.	Q.
Ninetyfold	10	0	0	18 to 26 Feb.	19 June, 8 July	42	14	3	4	5	2
Epicures	6	0	0	27 Feb. to 1 Mar.	9 July to 19 July	31	7	2	5	4	2
Midlothian Early	4	0	0	1 to 4 Feb.	19 to 26 July.	18	10	0	4	12	2
	20	0	0			92	12	1	4	12	2

The above yield includes 15 tons seed retained for our own use.

Our total marketing expenses this year were £133 2s. 1d., as against £176 1s. 3d. in 1912, £131 9s. 4d. in 1911, and £40 10s. 6d. for 1910.

The first three figures are larger than those up to 1910, by reason of our marketing in Chip Baskets. These expenses include the cost of the chips, freight, twine, etc., in addition to other expenses in marketing.

The following Table shows the comparative results arrived at here each year, since we started growing in 1908 under your Department's guidance :—

Year.	Com- menced digging on.	Total Area for Sale, Statute.			Yield.			Gross Receipts.			Average received per Ton (gross).			Average Return per Statute Acre (gross).			Average Yield per Statute Acre.		
		A.	R.	P.	T.	C.	Q.	£	s.	d.	£	s.	d.	£	s.	d.	T.	C.	Q.
1903	June 9	2	3	39	15	12	1	159	14	4	10	0	0	53	0	0	5	4	0
1904	" 7	4	3	5	22	3	1	181	15	1	8	4	0	38	0	0	4	12	0
1905	" 13	5	2	20	34	18	2	230	11	5	6	12	0	41	0	0	6	4	0
1906	" 23	4	2	21	21	17	3	148	10	4	6	15	0	30	0	0	4	14	0
1907	" 11	15	0	12	64	4	1	399	4	10	6	11	3	26	0	0	4	5	0
1908	" 22	10	3	0	62	2	2	264	1	5	4	5	0	24	11	3	5	15	2
1909	" 7	11	0	36	49	5	2	309	12	4	6	5	8	27	11	7	4	7	3
1910	" 15	11	2	36	71	15	3	326	8	0	4	11	0	27	13	4	6	2	1
1911	" 5	14	1	13	79	7	0	585	5	10	7	7	6	40	16	10	5	10	2
1912	May 30	18	3	28	117	17	2	781	10	1	6	12	7	41	5	11	6	4	2
1913	June 19	20	0	0	92	12	1	618	16	4	6	13	4	30	18	10	4	12	2

This Table includes the potatoes kept each year for seed, and these have been valued this year at £4 per ton, same as last year. The fact that we include the seed at this price tends, of course, to bring down the average received per ton in each year.

This year's gross receipts as will be seen from the Table are much less than those of last year, and this is accounted for by the poor average yield per acre—4 tons 12 cwt. 2 qrs., as against the 6 tons 4 cwt. 2 qrs. obtained in 1912.

The marketing in Chip Baskets this year was, in proportion, much more expensive than last year, as we started so much later this year, and a larger proportion this year was sold in barrels and hampers. We sold only some 6,280 baskets this year, as against 9,768 last year.

Last year was an exceptionally good year, both for earliness and yield; this year has, I think, been exceptionally poor, and I think possibly about one of the worst years we could have.

Our average yield this year was affected by our having so large a proportion of 'Ninetyfold' as against 'Epicure.' Last year we had mostly 'Epicure,' which is a heavier yielding variety. In a bad year such as this, I believe it does not pay to go to the extra expense of marketing in Chip Baskets, but we must only take the bad years with the good, and after the three years' experience we have now had, we are still quite satisfied to continue our marketing, as far as possible, in these packages. The baskets meet a ready

demand in England, and provided the potatoes are early enough they can be sold in large quantities.

As in former years we planted Yellow Turnips, Oats, and Italian Rye Grass (mixed) for cutting green for dairy cattle, after the Early Potatoes were dug. The advantage of having two crops in one season is, of course, obvious, and the second crop must be taken into consideration when noting the return received from the Early Potatoes above.

J. A. COOPER,

Agent for Sir Josslyn Gore-Booth, Bart."

At several other stations [in the neighbourhood of Sligo the Department put down experimental plots, providing, as usual with beginners, the seed, artificial manure, sprout-

Kilmacowen, ing boxes and direct instruction. In Kilmacowen
Skreen and District there were thirty-eight experimenters
Dromard Districts. who grew one rood each with varying success, the highest yield per acre being £42, and the lowest £9 10s. Some of the plots were good, but a number were very poor, and those brought down the general average to slightly below £28 per statute acre. In the district of Skreen and Dromard there were thirteen experimenters. Amongst these there were three who realised over £30 per acre, and one who realised £42 18s. 8d. per acre, but several fell as low as £12 to £14, reducing the average for the district to £20 6s. 10d. per statute acre. Plainly there ought not to be such a difference in the value of crops in the same district.

In North Sligo, in the neighbourhood of Ballinfull, there were thirteen experimenters whose average over the whole was £25 10s. 3d. per acre. The lowest return amongst this lot was

North Sligo £14 2s. 3d., and the highest (Mr. M. Ferguson),
District. £40 2s. 0d. The land in this district is extremely

suitable for the purpose, and another year's experience should enable growers to produce more evenly crops and a much higher average than they have done this year.

The marketing branch of the Department assisted the growers at various centres, and a considerable proportion of the early potatoes at Sligo and Dungarvan were forwarded in Chip

Marketing. baskets, having been sold at firm contract prices.

The system is still under trial, and it is too early yet to declare whether this method is successful.

There is not much to remark about the tillage of the crops. The season was distinctly unfavourable, and the crops never had the appearance of former years. It was a season in which it paid to wait for the crop, but Irish growers as a rule are better to quit their crops while the tonnage is still light.

M. G. WALLACE.

CROP REPORT No. 4: MID-OCTOBER, 1913.

The early portion of the harvest was favoured with fine weather conditions, and over most of the Southern and Midland areas the corn crops were all cut and saved in splendid condition. At the second week of September a break in the weather set in which made the later harvest much more tedious and considerably increased the difficulty of getting the crops sufficiently dry to be ricked. The air temperature, moreover, kept high, and this together with an absence of strong, bustling winds checked the winning process and led to a considerable amount of heating in the stack. The reports regarding the damage done to both grain and straw from this cause are general. At the beginning of October weather conditions improved somewhat and a spell of bright, cool days with strong drying wind was experienced, which did much good at a very critical stage and rendered safe a larger proportion of the crop. Even at mid-October there is a portion of the crop still in stocks in the fields and still a few late patches in exposed situations remain to be cut. Threshing is nearly completed in the Midlands and South and is now general in other parts of the country. Yields of both wheat and barley will be close up to average, but the yield of oats, both as regards grain and straw, is smaller than last year. Samples of both wheat and barley are stated to be excellent and the bushel weights high. Oats in many cases is inferior and lacks the plumpness of other years; much damaged oats is at present being marketed, and prices are in consequence depressed.

One feature of this crop season is the potato crop, which is generally considered satisfactory in yield and excellent in quality. Only in the case of very light shallow soils can the return be complained of; on good rich soils a better yield has not been obtained for years; tubers so far are very clean and free from disease. Mangels and turnips have made marked improvement since the moist weather set in, and while showing poor promise at one stage, they are now expected to turn out a fair average yield; they are still favoured by the weather conditions and are bulbing very satisfactorily. Other green crops, such as cabbages, rape, etc., are also growing well for the past month.

Scutching of the flax crop has just begun; the yields recorded so far are variable, but the general opinion is that the yields will be average and the quality fair. Early markets have a quiet tone, and prices are considerably below the opening rates of last season.

Pastures have made a good recovery during September and are now well stocked with grass; aftergrass, however, is poor in general.

Live stock are not so forward in condition as other years but are healthy and fetching good prices all round, especially beef cattle, thick and well-conditioned stores, milch cows and springers. Fat

sheep and lambs are scarce and dear just now. Pork still maintains high rates, though there has been a slight drop recently. Poultry stocks are much as usual. Geese numbers may be about the same as last year, but turkeys are expected to be scarcer owing to losses among the young birds during the cold, wet months of the early rearing period.

Reports from the different counties received at mid-October are summarised in the following paragraphs, which indicate the present condition of affairs as regards both crops and live stock.

Leinster.

Wheat was harvested in fine weather ; yield is reported fair. Oats will be under average both in yield of grain and straw ; the grain is of good quality except where injured by being ricked too soon ; in the late districts the crop was hard to save owing to the want of good winning weather while in stook. Barley is the best cereal crop in the county ; yield is from 8 to 10½ barrels per statute acre ; the sample is excellent, but prices, 14s. 9d. to 15s. per barrel, are 2s. below last year's rates. Potatoes are excellent as regards quality, but the yield may be smaller than usual ; there is practically no disease. Mangels, though not a good crop, have made excellent growth during the past month. Turnips are very patchy and below average ; the late rain has served them well. Pastures have recovered wonderfully during the last four weeks ; prior to that cattle were losing flesh and the milk yield was considerably reduced. Live stock are now doing well ; there is an apparent scarcity of store cattle suitable for stall feeding.

Wheat this season was good both in respect of yield and quality. Oats were a variable crop ; yield may be about average. Barley proved to be good. The potato crop is of excellent quality and the yield will be up to average. The root crops, both mangels and turnips, will be decidedly under average though latterly they have improved much. Pasture recovered well during September, but there does not appear to be much winter keep on the land.

Yields of wheat are stated to be disappointing. Oats, which is all cut and saved, turned out a better crop than was at one time expected. Notwithstanding the exceptionally fine weather at cutting time there seems to have been great difficulty in getting the crop stacked in good condition and there are many complaints of heating. Barley is a good average crop ; it was well saved and the grain is bushelling well. Potatoes are a good average crop, and are splendid for table use ; there is very little sign of disease

amongst them. The mangel crop has turned out better than was at one time expected, but is still under average. Turnips also have improved wonderfully and in some places will turn out a good average crop. Pastures, as a rule, are very bare and there is a scarcity of after-grass. For this reason cattle have not improved in condition as they should, and in some instances would at present barely realise the high prices paid for them in spring.

Wheat turned out a good crop ; most of it has been threshed and sold ; prices were satisfactory. Oats can only be described as fair ; although the season was fine, much damage resulted from heating in the stack, so that threshing off is being hurried and a lot of grain is being marketed too soon. Barley is up to average in yield ;

early threshed lots sold at good prices ; broken weather has operated against growers in the later districts ; the market, however, is still good, though locally prices are fully 9d. per barrel below last year's rates. Potatoes are a fair crop and of excellent quality, and there are very few diseased tubers this season. Mangels and turnips have been greatly improved by recent rains, but will not be a full crop. Cabbages and carrots are also much improved of late. Pastures are green and growing well, but there is nothing like a reserve on the land to carry stock over the winter as in ordinary years. Still, with a fair turnip crop, a medium amount of straw and a lot of good hay, the prospects for the winter feeding of cattle are good. Springing cows are very scarce and fetching high prices. Breeding ewes and lambs are also scarce and dear : good store lambs are bringing as much as 38s. ; young pigs are selling at from 25s. to 35s. each ; eggs continue to bring good prices and are at present fetching 1s. 1d. per dozen.

Wheat is now all saved, and some which has been threshed will average about $8\frac{1}{2}$ barrels (20 stone) per statute acre. A large portion of the oat crop, owing to the unsettled weather, is still in hand stacks and some still in stook ; the grain is not very well filled and the yield is likely to be light. The early threshings of barley showed a fine sample, but the yield, especially on light land, will not be as good as last year : the average may be from 9 to 10 barrels per statute acre. Rye is very little grown, but the crop is good and may yield about 10 barrels per statute acre. Potatoes are a record crop and the quality is excellent and there are scarcely any diseased tubers. Mangels are good and growing well. Turnips, which suffered greatly from blue aphid during the dry weather, are now coming on well and promise a good crop. Rape looks well. Pastures have improved very much since the rain. Cattle generally are in a thriving condition. Dairy cows are especially

Co. Kilkenny.

King's Co.

dear : aged bullocks of good quality and condition are commanding a good price—fully 20s. per head more than last October.

Wheat is only grown in a few districts ; yields are fair ; spring-sown fields turned out a light crop. Oats are much under the average, especially on wet land. Ripening was very uneven, and subsequently there was much heating in the stack. Potatoes are a good crop of average tubers of prime quality ; there is some appearance of this crop being touched by blight, the tubers being blackened on the surface without being badly affected. Mangels are much improved ; the roots are of good size, but there are many misses in the crop. Turnips are generally poor, although some fields are now growing well. Cabbage has done very well lately ; it is chiefly grown on the sides of potato ridges. Pastures are still capable of carrying full numbers of stock and are looking fresh and green. Stock have thriven well, though there was a good deal of sickness from last year's bad hay crop. All cattle in forward condition are selling very well ; sheep, likewise, are very dear.

The small area of wheat grown turned out an average crop. During the past three weeks it was very difficult to get oats in condition for being ricked, and a great percentage of the crop heated in the stack ; yields are under average ; top price is 11s. per barrel (14 stones). A large quantity of the barley crop was also damaged while in stack ; yields have been about average ; good samples of malting barley fetched 16s. per barrel. Potatoes are a very good yield, and the quality is excellent. Mangels have made wonderful progress for the past month. Turnips, also, have done well of late and promise a good crop, although the crown of a good many roots show signs of disease. Pasture is at present plentiful, and cattle is doing well. There is now a sufficiency of grass for both cattle and sheep. Prices of cattle have improved at least 10 per cent. during the past three or four weeks.

Harvesting of the grain crop is practically over, though in some districts oats are still out in hand-stacks in the fields. Threshing operations are in full swing. Wheat which was saved before the weather broke threshed out a good crop ; it was difficult to get the later cut crop ricked in condition ; yields may run from 10 to 12 barrels per statute acre. Oats are very variable in yield ; much of the grain is discoloured owing to heating in the stack, which was very general ; prices locally are low. Barley is threshing out a good sample, but the yield per acre will hardly be up to average. Potatoes are much better than were expected

and the quality excellent ; all over a good average crop except on light soils. Where spraying has been done there is yet no trace of disease. Mangels are, in general, only a moderate crop, but are now bulbing out well. Early-sown turnips are good, but the later-sown yields are much below average ; there are some complaints of the roots becoming discoloured and unsound though healthy-looking outwardly. Rape and vetches did very well, but cabbages are stated to be small and stunted. Pastures are much refreshed and look well, though grass is none too plentiful. Cattle and sheep are in fair condition and fetching good prices.

The wheat crop has turned out average. The yield of oats is good, though the crop was light in many places. Barley is yielding satisfactorily, though much of the crop has not been well saved, and the quality has suffered in consequence. Threshing operations are very late this season, and a great quantity of both barley and oats has been out in hand-stacks during the recent rains. Barley coming into market is, as a rule, slightly damp and in some cases discoloured. Potatoes are a good crop except on damp soil or mountainy land, on both of which they gave a poor yield. Mangels promise well, and turnips, which have improved much since the break in the weather, may be a fair crop yet. Cabbages are good. Pasture is looking well now and live stock are in good condition ; all classes of cattle are selling well, with the exception of stores, which are a slow trade.

Wheat little grown ; yield about average. Oats rather a thin crop ; in some instances a good return ; in other places light, both as regards grain and straw. Barley was an average crop and the sample fair. Rye is an average crop. Potatoes will yield well above the average, and the quality is very good ; though the tubers are small in some cases, there are many splendid crops. Mangels will scarcely yield an average crop generally. Turnips may yield well, and are now making good progress ; the crop is much better than last season. Cabbages will give a fair yield ; autumn-sown vetches are doing well, and rape (summer-sown) is also making good growth. Pasture is still looking green owing to moist weather ; on light soil which got burned during the dry weather grass is very scarce. Live stock of all classes are healthy.

Wheat was a full average crop : yields ran from $7\frac{1}{2}$ to 9 barrels per statute acre ; in some cases straw was rather light and yield of grain per acre small ; as the crop was harvested in fine condition, samples were of very good quality.

Co. Wexford. Lea oats, as a rule, was very thin, and, in consequence, gave a very poor yield of straw of coarse quality ; the grain—both winter and spring-sown—is very

good ; the current price is 9s. 6d. per barrel (14 stones) ; there are many reports of oats heating after being stacked. Barley, for the most part, is a very fine sample and returning a fair yield of from 9 to 10 barrels per statute acre ; the crop as a rule was well saved except in a few late districts ; above one-half has now been threshed, but some still remains in the fields. Bushel weights run as high as 59½ lbs. : the best price paid was 15s. per barrel (16 stones), but latterly there has been a downward tendency owing to slackness in demand and the rush of supply on the markets ; rates at present stand at 14s. 6d. per barrel. Raising of the potato crop has not begun yet : the crop generally will yield well and in all cases is of exceptionally good quality : the average may be about 6 to 7 tons per statute acre. Mangels will be under average in yield though they have done very well latterly. Turnips do not promise to be anything exceptional, but have made rapid growth for the last few weeks. Pastures are now fresh and green, but the covering is small and the aftergrass on mown lands is very poor ; as a rule grass is of a soft character, and there is very little winter keep. Live stock are healthy and thriving well ; the return from cows is under the average and stores would pay badly for summer keep if marketed at present. Sheep fattened badly through the summer ; fat lambs were scarcer than usual, and though prices were normal, the trade was not too satisfactory for flock owners.

The small quantity of wheat grown was hardly up to the average as regards yield of grain and straw, but the quality of sample is excellent. Oats has nearly all been carted and much of it threshed out with very variable results as regards yield ; on the whole, the crop will be below average, but the quality of the grain is satisfactory ; a good deal of trouble was experienced through heating taking place in the ricks before threshing time ; in the late districts the crop is still in the fields in small stacks ; the yield of straw will be short. Barley is very little grown ; the yield of grain is about up to the average, and in point of quality it is, as a rule, considered good. The raising of the potato crop has just begun : late varieties are yielding well, though in some cases the tubers are rather small ; in many fields the leaves are still green, which is most unusual at this time of the year ; the quality of the tubers is excellent all round, and they are practically free from disease. Mangels are now bulbing out well but will be below the average. Turnips promise well except where sown late ; in many early-sown fields there is a marked discolouration noticeable about the centre of the crown. Cabbages planted lately have done well, but the summer crop did not come to much owing to the continued drought. Rape, the only green crop sown to any extent, is very good. Pasture has

Co. Wicklow.

improved wonderfully since the September rains set in ; both cattle and sheep are now getting into condition after a scarce grass summer ; stores of both classes are making a dull sale just now ; fat sheep are very dear and scarce.

Munster.

Wheat, though very little grown, was a good crop. Oats did fairly well but the crop was much injured by the recent rains and difficult to save ; many stacks had to be opened out and re-built. There is only a small area of
Co. Clare. barley grown in the county ; the crop was badly lodged and injured by rain when fit to cut.

Potatoes are very good, though from some districts there are complaints of poor yields ; the quality of all varieties this season, especially Champions, is excellent. Mangels will be an over-average crop. Turnips in most districts are bad, except the very late varieties, which are good. Cabbages, which are widely grown for green feeding, have done well. Pasture has done well, and cattle are in good condition and bringing good prices. Butter production has paid very well this year. Sheep, pigs and horses have also brought good prices. Turf for winter firing was cut and saved in splendid condition.

Wheat is nearly all threshed : the yield was good and the quality excellent : return would reach 11 to 12 barrels per statute acre in some cases ; local prices were from 18s. 6d. to 19s. per barrel (20 stones). Threshing of the oat crop is still proceeding ; the yield, though fair, is perhaps hardly average ; the sample is not so well coloured or so plump as in other seasons. In the late ripening districts there was much heating in the stacks, many of these having to be re-made ; there was some difficulty in getting the crop threshed clean this year as it was not so ripe as it appeared to be at cutting time ; on the other hand, there was very little grain lost by shedding ; local prices are : black oats, 5s. to 5s. 4d. ; white oats, 5s. 6d. to 6s. ; a few extra samples of the latter realised 6s. 2d. per cwt. ; straw about £2 per ton. The yield of barley was generally good and quality very good ; most of the crop has been threshed ; good malting samples realised 15s. 6d. per barrel ; latterly prices have fallen to 15s. ; a good many growers are holding in expectation of an advance. Rye, which is only sown as a catch crop, has been widely put in this year in prospect of shortage in the root crop. The potato crop, though rather variable as regards yield, will on the whole be well up to average ; the quality is excellent ; Champions planted in ridges are a small crop in late districts ; in other districts the crop is described as the best for years. Mangels have improved

much, but will be under average. Turnips made considerable headway since the opening of the rainy weather ; prospects of a fair yield are now much brighter. Cabbages were seriously damaged by green fly ; owing to the very dry weather at the usual time of planting (July and August) there is a lesser area grown than usual, which will cause a considerable scarcity of early winter feed for cows. Pasture is much improved, but after-grass is not nearly so good as usual ; owing to the shortness of grazing during the summer cattle are thin ; dairy cows have not milked so well as last season, and early calvers have gone dry a month sooner than usual ; autumn feed for cows is very scarce, but the recent improvement in grass will help ; springers and young calves are selling very well ; stores are lower in value than in August. Price of pigs still continues 60s. or over per cwt. ; bonhams, which are now in demand for the consumption of waste potatoes, are very dear—37s. 6d. to 45s. at from 9 to 12 weeks old. Sheep and lambs are dear in consequence of the limited supply.

Wheat is average ; little grown ; none threshed yet. Oats is light in straw ; the grain is good but will hardly be average in yield. Barley is under average in yield ; sample fair. Rye is very little sown ; the crop did well on high, dry bog land, but is poor on cut-away bog, with a light surface and cold, hard sub-soil. Very little of the potato crop has been dug as yet ; the crop is still growing ; tubers are rather small but dry ; in some districts yields are expected to be poor. Mangels are doing well and will be a good average crop. Turnips will hardly be average ; the foliage as yet carries a shrivelled appearance but is improving recently with the moisture. Pastures are now doing well. Dairy stock are backward in produce and condition.

Wheat was cut and saved in splendid condition ; the grain is plump and well filled ; early winter sowings are best ; yield fair. Owing to the weather change early in September, harvesting of the oat crop was rushed somewhat ; not being dry enough or long enough cut, the crop heated badly in the stack so that threshing has been rather premature. Yield of grain about average ; prices rule from 9d. to 9½d. per stone for white oats, and 8½d. for black. Digging of the potato crop has begun during the past week ; returns are average and better than was expected ; much “blackening” of the crop is reported to have occurred within the past ten days. Mangels are growing vigorously still and promise to yield well ; in some places there are reports of the roots being damaged by heart-rot. Turnips, which have done well since September set in, are also stated to be similarly affected ; in some districts the crop is reported as sound

and over average. Pastures, and especially aftergrass, are growing well now ; store cattle are selling well ; price for good calves is well above average, £6 to £7 5s. being not unusual for six months old animals ; store and fat sheep are scarce and dear ; milk supply at creameries is above average for the season.

Wheat is not much grown ; almost all threshed and returns so far are very favourable. Oats ripened late, but is threshing out generally a good, sound crop and yields will be average ; in late districts some yields are still out.

Co. Tipperary.

Barley will not yield as well as anticipated and will be below last year's average. Prices opened at 14s. 6d. per barrel (16 stones). Potatoes are a very good crop and continued green up till October ; they never were better for eating and there are very few black or damaged. Mangels are fair but yield will not be average ; in a great many fields large patches are affected with heart-rot. Turnips may be fair and have improved generally during the past month ; late-sown fields on light land are poor. Cabbages are good in some districts ; elsewhere are very poor, having been much checked by the drought of July and August. Pastures are bare though somewhat freshened up of late ; there is a poor growth of aftergrass. Live stock are now doing well and milk cows have improved much in yield though on the whole it was a very bad season for dairying ; cattle in condition are selling well, but both cattle and sheep are generally backward in condition.

The bulk of the grain crops was saved in good condition ; small areas in late districts suffered from the unfavourable weather at the end of September ; in many cases heating occurred due to hurried rickings. Threshing operations are well forward, and will be completed in another week or two. Wheat is not grown except

Co. Waterford.

in very small patches ; the yield, however, was good. On well cultivated land oats did better than was expected, and gave a more than average yield of grain which bushels well ; the bulk of straw this season is a quarter below average but is excellent for feeding ; price of grain is rather low, 9s. to 9s. 6d. per barrel (14 stones). The quality of the barley grain was good ; yields were below average ; current price is 15s. per barrel (16 stones). Potatoes are a poor crop on light lands ; are very good on rich loam soils. On the whole the crop will be about average ; Up-to-Dates are a very heavy crop in some districts ; there is practically no disease ; lifting is proceeding rapidly. Mangels are a fair average and much improved by recent wet, mild weather ; patches affected by heart-rot are reported in some fields. Turnips are now growing well and are likely to pull a good average crop. Cabbages and field

carrots are fair, but the few fields of rape grown are not good ; it did not recover from the effects of the drought so well as the turnip crop. Pasture is very fresh now, but grass, though fairly plentiful, is very soft and young and will not stand much frost. Beef cattle, milch cows and springers are fetching good prices ; forward stores are very scarce ; backward stores are hard to cash at profit from July ; owners are in consequence holding over, having abundance of excellent fodder. The milk yield is short for this time of the season. Store and fat sheep of all kinds selling at prices 12s. in advance all round on last year.

Ulster.

Wheat was generally secured in very fair order. The early cut oat crops got long exposure to bad weather, but on the whole did not suffer very badly ; there were some complaints of grain growing in the stook, and many farmers stacked too early, and as a consequence there is a good deal of heated grain. The weather broke at

Co. Antrim.

11th September, just when stacking was about to commence ; the later ripening portion of the crop got an excellent harvest ; lea oats generally is short and the whole yield below average. Cutting of the bean crop is almost finished and yield promises to be good. Potatoes are a good crop and free from disease ; many fields are yet quite green. Mangels are not much grown, but in some places are an excellent crop. Turnips have improved very much of late and will be a good crop on the whole. Cabbages have done very well and are growing excellent hearts. Flax yields are very irregular ; some very good and some very poor ; the crop suffered much from weather exposure ; the fibre is in some cases deficient in strength ; there has been only a small quantity scutched yet. Prices are rather disappointing, ranging from 5s. per stone to 8s. Pastures improved wonderfully during September and many fields still afford a good bite ; aftermath, as a rule, was very poor. Store cattle are improving in price ; fat stock easier than two months ago, but demand generally good for finished cattle ; sheep very dear ; pork has dropped slightly.

The area sown with wheat was smaller than usual owing to the unfavourable seed-time. It was a bad harvest for saving the oat crop and quite a number of fields are still uncut.

Co. Armagh.

Yields are not up to average and much of the grain is in bad condition ; prices locally are from 5s. 6d. to 6s. per cwt. Potatoes are a good crop ; many fields are green yet and still growing ; raising has just begun ; British Queens have not been yielding well ; Up-to-Dates are a very much heavier crop. Mangels are only a medium crop. Turnips are now making good headway and will turn out a good crop. Very little

flax scutched yet ; some of the crop is still in the spread-field and some even in the steep ; a few good yields have been already reported. There is plenty of feed on pastures and cattle are looking well ; trade for good stores is improving.

The small plots of wheat grown were very good and well-ripened, but the crop has not yet been threshed. Any oats sown in good time turned out a fair crop ; late sown fields on cold, wet soil were inferior ; yields cannot be near an average ; the crop for the most part is now safely harvested, though some fields are still to be seen in the stook, and a few small patches still remain to be cut. Rye grown in small plots in moory soil was very good and yield will be about average ; it has all been now saved and gathered in. Potatoes are in most places a good or over-average crop, especially on fresh moory land ; they are small-sized but plentiful on upland soils ; quality is excellent ; raising has begun on some farms. Mangels are patchy and though doing very well at present, will hardly be up to average. Turnips are swelling up much better than was expected during the early part of the season and promise an average crop. Cabbage is a poor crop generally. Flax may be a good average crop but was rather late in being retted owing to the nature of the season. Pasture is fair and much improved by recent rain, and stock are looking very well generally ; pork is being turned out in great quantities—62s. to 68s. per cwt. (dead weight) being the present prices ruling.

Very little wheat is grown. Early-cut oats suffered a good deal in the stook owing to heavy, damp weather ; that cut later was saved in better condition ; in mountainous districts there are still some small patches to be cut ; the crop ripened unevenly as a result of worm attack, and yields will be below average ; the quality of the grain is fair. Potatoes are a splendid crop and of prime quality ; very few diseased tubers ; on warm, well-manured soils the crop is exceptionally heavy. Mangels are a good average crop and are still growing ; some fields show much bolting. Turnips are looking extra well and if they get favourable weather for the next two months should give a good yield. Cabbages are doing fairly, but are slow in hearting. Flax is an average crop but very little scutched yet ; some lots were injured from getting too much rain while on the grass ; the crop as a rule, however, was well saved ; some growers are of opinion that the yield will be below that of last season. Pastures are now green and fresh ; cattle and sheep are doing well ; strong, well-conditioned cattle are fetching high prices, though stores are a slow market ; milch cows, sheep of all kinds, and young pigs are very dear.

Wheat is a fair crop and mostly in the stack ; it got too much rain and is badly discoloured in most cases. The oat crop is variable ; yields will be below average ; straw was short and is much injured as fodder ; a large portion of the crop was ricked too soon and had to be threshed off. Barley is a fair crop, but much of the grain is

Co. Down. discoloured. Potatoes are excellent except on very dry fields ; so far the tubers are practically free from disease ; raising of the main-crop has just commenced. Mangels are patchy, but may be average yet. Turnips, which will be from good to heavy, according to soil, are growing fast now. Cabbages, which were long checked, are bulking fast and will be valuable infeeding for dairy cows when first housed. Flax is reported to be yielding well in the mill but prices are not so good as last season, current rates being from 6s. 6d. to 8s. 6d. per stone. Pasture is now much improved, but is still very poor. Store cattle left a good account of themselves, and milch cows did well until September, after which it was difficult to keep up the milk supply.

The wheat crop is mostly all well saved ; some spring-sown fields which failed to ripen have not yet been cut ; yield will be under average owing to the thinness of the crop. Oats were also well saved unless in a few mountainous districts where it did not ripen and is being cut for cattle feeding ; it is generally estimated that

Co. Fermanagh. the crop will yield at least one-third under average. The small amount of rye usually grown on dry, mossy bottoms has been well saved and the yield will be about average. The potato crop is turning out much better than was expected ; the quality is very good and there are very few diseased tubers ; the yield will be up to if not over average. Mangels have improved of late, but will not be able to make up for the bad start ; yield will be under average. The turnip crop has done very well latterly and with a continuance of favourable weather the yield should yet be up to the average. Cabbages are growing well and will be a heavy crop. Flax yields will be light owing to the thinness of the crop and the failure of fields with heavy, wet soils. Pastures gave a good return unless on very dry fields. | Live stock are in good condition.

Wheat was a good crop and was well saved and stacked. Oats has been well saved, but was hard to harvest owing to rain ; as a rule it has not bulked so well as last year's crop ; however, although the yield of straw is less, the crop is well headed and should thresh fully, as much grain per acre as last year's crop ; it is now nearly all stacked except in high, late districts where cutting has still to be done ; the straw will not make nearly so good fodder as last year. Beans are not much grown ; the cold, late spring interfered

very much with their growth, and now, although well podded, they look very thin on the ground ; very little has been cut as yet. Digging of the potato crop has not yet begun ; the crop is highly satisfactory both as regards quantity and quality, and there is on the whole practically no appearance of disease, though in some districts Sutton's Abundance are reported to be showing a good number of affected tubers. Mangels are promising better than expected, and may yet be an average crop. Turnips in ground look well, are clear of weeds, and show a fine appearance of bulbs ; they should turn out a splendid crop. Flax has not been scutched in sufficient quantity to form an opinion as to its yield, which some growers think will not be as good as usual ; local markets are opening with low prices and slack demand. Pastures are holding out well and stock are healthy ; store cattle fit for feeding are in good demand, and are fetching fair prices ; grass beef is dear ; dairy cows are not milking well ; pork is fetching 63s. per cwt., and young pigs are selling at from 35s. to 40s. each.

The wheat crop was average and well saved. Oats are a very poor crop and are expected to thresh out badly as the grain is not well filled. The little barley grown was good, but

Co. Monaghan.

quality of samples was very irregular. Potatoes are average to good ; tubers are numerous and sound, but the proportion of small ones is rather high. Mangels and turnips may still be good average crops ; they have made fine growth since rain fell. While the yield of flax straw appeared small in many cases, still it yielded better at the mill than was expected, and the quality is a good average ; scutching has now begun at most mills. Pastures are much improved by the late rain. Live stock did not thrive so well this summer as usual owing to the drought ; both horses and cattle are fetching good prices ; the price of pork is being maintained and young pigs are dear.

Lea oats were a good crop ; fields after manure were much lighter ; there is an average crop of straw ; threshing results show good yields ;

Co. Tyrone.

harvesting was very tedious owing to lack of strong drying winds ; stacking is now almost completed ; some oats around the edges of the hills are still uncut. The potato crop is very good and raising has just commenced ; there are very few diseased ; local prices are, Up-to-Dates, 2s. per cwt. ; Skerries, 3s. per cwt. Mangels are a good crop generally. Turnips are a full crop, but may hardly be up to average on some soils. Cabbages are very fair. Flax in general pulled lighter than last year. The quality is fairly good, but yields so far are reported as variable ; scutching has just begun. Pasture is good for the time of year and young stock are in forward condition ; milch cows will require hand feeding from the present ; cattle are selling well, especially springers and good, strong stores ; pigs scarce and very dear.

Connaught.

Return of wheat will be slightly under average ; the crops are splendidly harvested, and the grain is well filled. Oats are all in stack now ; lea oats yielded well ; crop on manured land will be under average ; grain is of excellent quality generally ; local price average $8\frac{1}{2}d.$ per stone. Barley a good, all-round crop ; yield slightly over average and sample good ; local market price, 15s. per barrel. Rye is a good crop, but very little sown. Potatoes will give an over-average yield, except on extremely light land ; tubers are practically free from disease and of excellent cooking quality ; a good deal of the crop is already lifted, but a portion is not yet ready as the stalks are quite green. Mangels have improved a good deal latterly and are now very fair, but the yield will scarcely be average. Turnips, too, are growing well now and show good promise. Cabbages and rape are crops which benefited much from the recent rains. Grass is now abundant on pastures and live stock generally are healthy ; except for light store cattle, prices generally are good ; ewes and wethers show an advance of from 10s. to 14s. per head as compared with last year.

Wheat is not much grown ; the crop was thin owing to the wet winter. The oat crop was well harvested, but the yield of both grain and straw is less than in previous years. Barley is not much grown ; the few plots to be seen did fairly ; the crop is coming into wider favour with farmers owing to its suitability for pig feeding.

Rye is an average crop, but is not so much grown as in previous years. Potatoes are best on moory land ; the crop is just being lifted and is fairly free from disease. Mangels are inferior, although they are growing well of late. Turnips will be much better than anticipated, but cannot be much more than medium. Cabbages are average. Pastures look well ; store stock, especially if in condition, are fetching good prices. Pork is bringing 58s. per cwt. and young pigs, 10 to 12 weeks old, 28s. to 40s. each.

Wheat not sown to a great extent ; autumn-sown has yielded a fair average crop and was harvested under favourable conditions ; spring-sown fields were very patchy and late in ripening. The oat crop is short in straw this season, but the grain is plump and well ripened ; in some cases stacking was done rather soon, and heating occurred in consequence ; yield not expected to be up to the average of other years. Barley is only sparingly grown and that chiefly for feeding purposes. Rye, which is chiefly confined to moory land, has yielded well in places. Potatoes in many places are still green ;

Co. Galway.**Co. Leitrim.****Co. Mayo.**

digging has just begun ; the crop is turning out very heavy in yield ; the proportion of diseased potatoes will be very small this year ; in some cases where the crop is grown on lea land in ridges the tubers are small. Mangels will hardly be average. Turnips will also be under average and is a very poor crop in the majority of cases. Cabbages are not so good as in other years. In the Ballina district the weight of retted flax is lighter than last year, but the quality and proportionate yield of fibre is expected to be better. Pasture is fair ; all classes of stock are selling well, particularly springers and milkers, as well as medium fat and fat cattle ; store prices are inclined to drop of late ; both fat and young pigs are bringing record prices ; sheep are scarce and prices are fully 12s. per head over last year.

Wheat was harvested in good condition ; straw and grain is of good quality but rather light in yield. The oat crop turned out satisfactory except in wet soil and has been well saved ; the yield is light and not so good as in other years. Barley has yielded comparatively well ; the grain is of good quality and is fetching a satisfactory price. Rye has yielded a good crop of straw and grain. Potatoes remained green for a very long time this season ; where the crop is ripe digging is now going on rapidly ; the quality of the tubers was scarcely better for a number of years ; in dry uplands the crop will be rather light, with a high percentage of small ones ; on low or damp lands the yield is well over the average. Mangels, though much improved of late, will be lighter than last year's crop. Turnips are still backward and will hardly give an average yield. Cabbages are a bad crop ; rape is fairly good. Pasture is rather bare, but much refreshed by the late rain ; live stock, healthy ; fat cattle and milch cows are selling well ; sheep are very dear ; lambs are 10s. per head over last year's prices ; litters of bonhams of only two or three are common this season.

Wheat was late in ripening and is not up to average in grain and straw, but is all stacked in fair condition. Oats gave a fair crop of straw, but the grain is inferior both in yield and quality ; owing to the recent damp, dull weather the crop was all stacked in a somewhat musty state. Barley is a fair crop. Rye is a fairly good crop and is now all satisfactorily stacked. Potatoes are an average yield and free from disease, and are of a very good quality. Mangels are a fair, average crop. Turnips are below average, especially where late sown ; in dry, light soil the yield is small. Pasture is looking fresh and carrying its full complement of stock, which have thriven well for the past six weeks ; prices somewhat disappointing to sellers except for small fancy stores ; cattle in forward condition are in best demand.

Co. Roscommon.

Co. Sligo.

THE IRISH FRUIT CROP, MID-OCTOBER, 1913.

Supplementary to the Report regarding this year's Fruit Crop which appeared at mid-July, the following summaries of information received through the courtesy of a number of leading fruit growers in each county as well as from the Horticultural Instructors indicate the chief facts regarding the larger tree fruits. This has been one of the worst fruit years for a considerable time. Not alone were the prospects of good yields injured by the unfavourable character of the preceding summer, but the severity of the weather during the spring months and especially at the blossoming period did much harm to blossoms and young set fruit. The long drought of July and August encouraged aphid attack, and in grass orchards was prejudicial to size in fruit. The month of September was, however, favourable for the maturing of the small crops being carried, and in some cases colouring has been finished better than for some seasons back. As a result of the character of the summer months there are widespread complaints of fruit being undersized and in many cases badly disfigured by scab.

Leinster.

Apples are scarcer than they have been for many years ; in some cases, however, they may reach a three-quarter crop ; Early Victoria and Grosvenor in most places gave best results, also Lane's Prince Albert ; Bramley Seedling was deficient in yield this season. The pear crop is poor and light. Victoria plums cropped well ; in a great many instances the crop was produced from second blossomings. Damsons are almost nil. Crab apples are scarce this season. Fruit during the latter part of the season swelled very well, but colouring was not so good as in the past two seasons. Fair local demand at moderate prices : 10*d.* to 1*s.* 6*d.* per doz. for good apples ; 8*d.* per doz. for plums ; 6*d.* to 1*s.* per doz. for pears.

Most varieties of cooking apples turned out well ; a good size and clean ; the best croppers were Lord Derby, Mère de Ménage, Peasgood's Nonsuch. Pears are very scarce. Victoria plums are good, but the other varieties are poor. Damsons were a failure this year. A fair season on the whole, and prices better than the last two years. Prices on the Dublin market were satisfactory ; good apples brought 1*s.* 6*d.* per doz. ; Victoria plums sold at 5*s.* to 6*s.* per 10 lb. basket.

Apples are an under-average crop ; Bramley Seedling, Lord Derby, and Worcester Pearmain are bearing a good crop and finishing well. Lane's Prince Albert, Allington Pippin and Grenadier are a fair crop in places, but the fruit is undersized and often of poor colour. Pears except in a few places, a very bad crop. Plums,

Co.
Kildare.

are good on walls and ripened well, especially Victorias. Damsons are a poor crop. Crab apples are scarce. September was favourable for colouring fruit, but much of it is deformed ; apple scab more prevalent than usual. Prices : dessert apples of good quality, 1s. 8d. per dozen ; cooking varieties, 1s. to 1s. 6d. per dozen ; pears, 1s. to 1s. 6d. per dozen ; plums, 4d. to 6d. per lb.

Apples are very variable ; new varieties have done best, especially Bramley's Seedlings, Lane's Prince Albert, Lord Grosvenor, and Cox's Orange Pippin. Pears are, on the whole, good ; some early varieties in sheltered gardens are bearing fair crops. Plums are below average ; Victorias yielded best ; many trees are bearing a second crop of small fruit, which will not ripen. Damsons are very scarce ; not much grown. Fruit chiefly sold locally ; prices for cooking apples ranged from 2s. to 2s. 6d. per stone ; dessert apples of first grade, from 3s. to 4s. per stone ; dessert pears of first grade, from 3s. to 4s. per stone ; plums, 3s. to 4s. per stone.

Apples a quarter crop. Pears bad. Plums average. Damsons bad. The demand for fruit is good, and prices likely to go up.

Apples scarce and of poor quality ; many are cracked. Pears are likewise scarce. The plum crop is very short but of fair quality. The damson crop is under average ; part of it is very good in quality and large, but many cracked with the rain just before ripe and so gave access to insect attack.

Apples are practically a failure except in very well sheltered gardens ; the same is true of pears, which are a very light crop all over. Plums are below an average crop on walls ; none in the open. Damsons are not more than half an average crop. Fruit trees generally are looking clean and healthy ; apple scab, however, appeared to be more prevalent than usual. Impossible to quote market prices as there is little local fruit for disposal. Some samples of first-grade apples fetched good prices.

Apples are a bad crop. Pears also are poor, and there is a very light crop of damsons and plums. Crab apples are scarce. Fruit generally is small and ripened early. Price for extra selected apples is 6s. 6d. per bushel. Damsons marketed in Manchester brought about £2 per cwt. ; blackberries were a great crop and fetched 3d. per lb.

Apples are a medium crop of small but well finished fruit ; early sorts, such as Ecklinville Seedling and Grosvenor, did best and were much helped by the fine weather in the early autumn months. Pears poor and small. Bush and standard plum-trees yielded a small crop ; the fruit ripened late but were mostly of good size and well flavoured. Damsons are not much grown, but as a rule a light crop : the warm weather of August and September greatly improved the yield. Good cooking apples sold at 20s. per cwt.

The apple crop is much below average, with the exception of Bramley Seedling, Lord Derby and Bismarck, which bore a fair crop of good size and quality. Pears are a very poor crop, with the exception of wall trees and in sheltered situations. Plums an average crop on established trees ; poor crop on young trees ; fruited fairly well on walls. Damsons in some few cases were good on old trees. There is a good local demand for all sound saleable fruit.

Apples are an under-average crop. Pears are poor, with the exception of one or two varieties. Plums and damsons are a failure. Fruit is of good size and colour where the trees were well manured. A good local demand for all fruit, especially cooking apples, which sold at from 4s. to 6s. per 100, and for dessert varieties from 5s. to 7s.

Apples below average and small : many dropped off before ripe. Pears a very bad crop ; only a very few varieties bore. Especially on south walls a great lot of trees came into bloom in late summer, and are carrying a second crop, which will do them much harm for the coming season. Plums are very scarce except Victorias, which bore an average crop in some localities ; they are also carrying a second crop which is ripening at the present time. Damsons are nil. There was more than a usual amount of scab and black spot on apples this season.

Munster.

Apples have matured in a very satisfactory manner but are below average in size, especially cooking apples ; dessert apples have proved variable ; most varieties have lacked size and, in many cases, colour also. Bramley Seedling and Worcester Pearmain cropped well, and in some places Lane's Prince Albert and Allington Pippin ; old orchards yielded badly. Pears are below

average yield and fruit small ; almost a failure in the open. Plums variable in some districts, but a light crop in general. Damsons a light crop, though not much grown. Apple scab and canker were the chief fungoid troubles. Prices : cooking apples, 6*d.* to 9*d.* per dozen ; extra picked, 9*d.* to 1*s.* ; dessert apples, 10*d.* to 1*s.* per dozen ; pears fetched 6*d.* to 1*s.* per dozen ; plums 2*d.* per lb.

Apples a poor crop but of very fair quality ; Bramley Seedlings in some situations are carrying a full crop. Pears are very light.

Plums are from poor to average. Damsons are bad. There is a good local demand for graded fruit, and prices well above average. Prices for apples ranged from 7*s.* 6*d.* to 12*s.* 6*d.* per 100.

Apples are below average ; a good crop in some districts ; young trees have done best. Fruit is large and well covered ; some varieties, notably Bramley Seedling, Lane's Prince Albert, Allington Pippin and Grenadier have cropped remarkably well. Pears are a good crop on walls ; not much grown in the open. Plums are also good on walls. Damsons a very light crop—not much grown. Nearly all the fruit grown is sold locally and the demand is greater than the supply. Prices of apples vary according to size : large cooking apples sell readily at 8*s.* per 120 ; seconds and thirds from 4*s.* 6*d.* to 7*s.* per 120.

Apples are average. Pears are poor, as also are plums. The fine weather of August and September favoured the colouring of the fruit, which is, however, small ; fruit as a rule is nearly a month late in ripening. Most of the fruit is sold locally ; a few growers market in Dublin. Dessert apples are fetching from 1*s.* to 2*s.* per dozen ; cooking apples are worth 1*s.* 6*d.* per dozen, and 1*s.* 9*d.* to 2*s.* per stone.

Apples were very late in ripening ; the crop is scarcely average in quality or quantity ; in favoured gardens young trees show full-sized fruit ; Bramley Seedling and Lane's Prince

Albert seem to be best ; on the whole the fruit has not finished well, and this is more marked in old orchard trees ; generally, apple trees have made good growth and ripened abundant fruit spurs. Pears are finishing fairly well on walls ; these are also late in ripening, a may be described as about average in quality but below average in quantity. Plums were average ; Victorias bore better crops and finished the fruit better than other varieties. Damsons are little grown. There is a good local demand for apples ; cooking varieties realised 2*s.* per stone, or about 1*s.* per dozen ; dessert apples brought as much as 3*s.* to 4*s.* 6*d.* per stone.

The apple crop may be considered average. Cooking varieties are scarcely up to the usual standard in size ; in old orchards the yield is very bad. Pears are a very poor crop and are nothing like an average. Victoria plums cropped well in most places ; other varieties turned out a failure. Damsons are scarce ; none at all on some trees. Most of the fruit is sold locally ; apples fetched 4s. 6d. to 6s. 6d. per hundred ; some early varieties, such as Beauty of Bath, were sent to the Dublin market and fetched 15s. to 17s. per bushel box.

Ulster.

Apples are not quite half a crop on the whole, though some cooking varieties, such as Early Victoria and Grenadier, yielded well ; Bramley Seedlings in large orchards are poor and suffered from scab in places ; in sheltered orchards, where the soil is good, this variety did better, and the fruit is of good quality. Pears are a poor crop and not much grown except on walls. Plums are very light in yield. Damsons, also, are scarce on the trees. Belfast, Dublin and Portadown are the principal Irish markets ; Scotch buyers visit the fruit-growing districts and buy the fruit of many orchards ; Belfast prices ruled high ; apples, 12s. to 18s. per barrel ; plums, 16s. to 30s. per cwt.

Apples are about a third of a crop ; fruit small and scabby ; yields much below last year ; quality is poor except Grenadiers ; black spot prevalent ; some of the varieties grown, notably Bramley Seedling, have improved well in size since the rain came. Pears are very little grown and are a poor crop. Victoria plums are a very small yield ; a second crop has come forward but will not ripen. Damsons are a bad crop. Owing to the scarcity of fruit, prices are high and demand brisk ; good apples of first quality brought 16s. per cwt., seconds 12s. per cwt., and thirds 8s. per cwt. ; boiling apples 4s. 6d. to 5s. per cwt. Plums realised about 24s. and damsons 30s. per cwt.

The apple crop is very poor and pears are very scarce on the trees. Plums and damsons are about medium, but much below last year's yield. The latter part of the season was fine, but fruit suffered much this season from the effects of the wet, sunless summer of 1912. Nearly all fruit grown is sold locally.

Apples are a small crop ; the fruit grew to an average size and coloured well ; Bramley Seedling did best. Pears are almost a total failure but not very much grown ; the same is true of plums and damsons. Apple scab fungus was very bad this season and did much damage to what little apple crop there was. Prices are

considerably better than last year ; all fruit finds a local market ; apples, 1s. to 2s. 6d. per stone.

Apples are not more than a quarter crop and quality medium ; the fruit is very small and in many cases affected by scab. Pears are a failure. Plums in some gardens are very good ;
Co. in others poor. Damsons are about one-eighth
Down. of a crop ; quality is good. Apples in the Belfast markets are fetching from 12s. to 16s. per barrel of 10 stone for nice fruit, well packed. Pears are sold in barrels of 6 stone ; samples are very irregular, and prices vary much owing to foreign supply ; good samples of plums and damsons brought from 19s. to 25s. per cwt.

Apples are poor ; Bramley Seedlings, in a few places, have matured a good crop of fair-sized fruit, but in the majority of Bramley orchards the crop is very light ; many old orchards of local
Co. sorts have a very light crop of small and badly-
Fermanagh. scabbed fruit. Very few pears are grown in the open ; a poor crop generally. Plums are a very light crop and some trees carry no fruit at all. Damsons not grown to any extent. Local sorts of apples have been selling at from 4s. to 5s. per cwt. ; Bramleys are sold in barrels and are usually marketed in December.

Apples are a poor crop in all orchards ; the only varieties carrying fruit are Bramley Seedling, Grenadier, Victoria, and Worcester Pearmain. Pears are a very poor yield. Plums are
Co. very light with the exception of Victorias. There
Londonderry. are practically no damsons. Grass orchards lacked moisture badly this season and fruit consequently was small. Prices ranged from 14s. to 20s. per cwt. for apples ; demand was good in Glasgow for early cooking varieties.

The apple crop has been almost a complete failure, and this, too, where the trees were well tended ; the last few months have decidedly favoured such fruit as there is. There are practically no pears in the county ; the climate is altogether unsuitable. Plums and damsons are a very
Co.
Monaghan. poor crop, so much so that up to the present none have been marketed. Apple scab was never so much in evidence. Almost all the large growers sell through the agency of the Ulster Fruit-Growers' Association ; a small percentage sell the crop on the trees to dealers, accepting a lump sum. Prices for apples will work out at 18s. per barrel.

Apples are scarce and what fruit there is is inferior. Pears are little grown and as a crop must be considered a failure. Plums, except Victorias, which were a fair crop, are a failure, as also are damsons. Blackberries seem to be the only crop of any quantity in some districts. Grenadier apples are selling at 2s. per stone in the orchard, and Bramleys from 2s. 6d. to 3s. per stone. Pears are bringing from 1s. 3d. to 1s. 6d. per stone.

Connaught.

Apples are small and a very poor crop ; about two-thirds of the trees carry no fruit at all ; Bramley Seedlings are a good half-crop.

Co. Pears are bad, but what few there are seem to be ripening up well and are larger and better-coloured than usual. Plums are scarce ; Victorias did best. Damsons are not grown. Local prices for apples were 2s. 6d. to 3s. per 100 ; good Bramleys and Grenadiers fetched 9d. per dozen.

Apples are much below average. Pears, plums and damsons are little grown and are a scarce crop. The last month's weather has favoured ripening especially on cordons and wall-trees. There is very little fruit marketed in the county as fruit-growing is only in its infancy.

Co. Apples are a very uneven crop ; some trees bear no fruit whatever ; Bramley Seedling has kept up its average well. Pears almost no crop. Plums are bad. Apple spot and canker have been severe this season. Fruit is all sold locally ; selected cooking apples, 3s. 6d. per stone ; inferior grades, 2s. per stone ; eating apples, 1s. per dozen.

The apple crop is small and in some gardens there is no fruit ; the size of the fruit is fair, especially Bramley Seedling, which, with Victoria and Worcester Pearmain, have cropped best.

Co. Pears are a general failure throughout the county. In a few places plums are fair, but in general the crop is bad. Prices realised locally are generally satisfactory ; ordinary mixed apples, from 3d. to 4d. per dozen ; picked fruit, 6d. to 1s. per dozen ; specially-selected, choice cooking apples, 1s. 6d. to 2s. 6d. per dozen ; good Victoria plums brought 10d. to 1s. per dozen ; other varieties, 6d. to 10d. per dozen ; large quantities of blackberries have fetched 4d. to 10d. per gallon.

Apples are scarce ; on some trees a fair crop is carried. Pears are disappointing. Very few plum trees have borne fruit this season. Damsons are sparingly grown. The weather since Mid-July has been more favourable for fruit in general, and apples in particular coloured well and swelled to natural size. Prices were average for any fruit marketed locally.

EGG RECORDS FOR THE YEAR 1912-13.

In the issues of the Department's JOURNAL, Vol. VIII., No. 4, and Vol. IX., Nos. 1, 3 and 4, articles appeared pointing out the need and use of egg records; and an article specially devoted to the keeping of egg records on the trap nest system was published in the JOURNAL, Vol. X., No. 2. Details of the results of the keeping of egg records during the year 1908-9 were published in the JOURNAL, Vol. X., No. 3; for the year 1909-10 in the JOURNAL, Vol. XI., No. 1; for the year 1910-11 in the JOURNAL, Vol. XII., No. 2; and for the year 1911-12 in the JOURNAL, Vol. XIII., No. 2. The following article gives similar particulars of the results obtained during the year 1912-13.

In all, the appended Tables (pp. 90 *et seq.*) give particulars of 156 flocks, but of these only 111 are complete annual records, as some of the record keepers did not send returns throughout the whole of the period, and others of them broke up their pens or changed their breeds during the year.

The general average for the flocks is rather more than 112 eggs per bird per annum.

Looking somewhat more closely into the returns it is seen that two flocks of birds gave results of over 200 eggs per bird per annum. In addition one flock gave over 190 eggs per bird, three over 180, two over 170, one over 160, eight over 150, ten over 140, eight over 130, thirteen over 120, and twelve flocks over 110 eggs per bird.

In all, 57 flocks gave over the general average, and 54 less than the average. Out of the 111 flocks, 76, or about 68 per cent., gave over 100 eggs per bird during the year.

The results obtained can be seen in detail from the accompanying Table :—

TABLE A.

Breed.	Average of all the flocks.*	Average of best flock.	Average of worst flock.
White Leghorns . . .	134.2	180.2	79.5
Brown Leghorns, . . .	149.6†	154.3	146.8
Black Leghorns, . . .	137.9††	137.9†	137.9†
Minorcas,	204.7†	232.9	188.6
Buff Orpingtons, . . .	113.9	143.6	63.5
White Orpingtons, . . .	108.8	144.8	84.8
White Wyandottes, . . .	102.2	181.9	71.4
Faverolles,	102.4	117.7	81.3
Plymouth Rocks, . . .	107.3	149.8	76.4
Houdans,	158.5††	158.5†	158.5†
Rhode Island Reds, . . .	122.3	190.7	106.3
Light Sussex,	95.3	149.7	64.1
Mixed Breeds,	112.1	173.1	50.1
All kinds,	112.5	232.9	50.1

* For the number of Birds of each Breed see Tables, pp. 90 *et seq.*

† One flock only.

†† These records relate to less than 100 hens.

This Table shows some striking facts. Thus, while White Leghorns had the satisfactory average of 134·2 eggs per bird the best flock of this breed gave the very good result of 180·2 eggs per bird, while the worst flock had the average of 79·5 eggs per bird. Similarly, White Wyandottes with the return of 102·2 eggs per bird had a best flock, giving the result of 181·9 eggs per bird, whilst the worst flock gave 71·4 eggs per bird. Rhode Island Reds, which showed the satisfactory average of 122·3 eggs per bird for all flocks, had the very good result of 190·7 eggs per bird for the best flock, and 106·8 eggs per bird for the worst. Again, Mixed Breeds, with the fair result of 112·1 eggs per bird for all the flocks, had the very good result of 173·1 eggs per bird for the best flock, but the very low result of 50·1 eggs per bird for the poorest flock.

The breeds that did well were White Leghorns, Brown Leghorns, Rhode Island Reds and Minorcas. The high result shown by the last named breed is partly due to the fact that the returns relate to only about fifty birds. The following breeds also gave satisfactory returns, but the records only relate to single pens :— Houdans had the good result of 158·5 eggs per bird per annum, and Black Leghorns the satisfactory result of 137·9 eggs per bird per annum.

For the purposes of contrast, the general averages for 1908-9, 1909-10, 1910-11, 1911-12 and 1912-13 are set forth below :—

TABLE B.

Breed.	Average for the Year.				
	1912-13.	1911-12.	1910-11.	1909-10.	1908-9.
White Leghorns, .	134·2	131·4	119·7	120·7	128·5
Brown Leghorns, .	149·6	130·0	122·9	131·0	121·3
Minorcas, .	204·7	131·9	133·0	123·4	107·1
Buff Orpingtons, .	113·9	102·3	102·1	104·2	119·6
White Orpingtons, .	108·8	112·5	116·8	105·5	—
White Wyandottes, .	102·2	115·1	106·5	90·5	123·2
Faverolles, .	102·4	81·4	95·0	105·1	107·5
Plymouth Rocks, .	107·3	95·2	112·8	117·8	93·3
Rhode Island Reds, .	122·3	138·8	128·5	—	—
Light Sussex, .	95·3	96·9	87·9	83·9	73·3
Red Sussex, .	—				
Mixed Breeds, .	112·1	109·0	111·6	112·0	105·7
All kinds, .	112·5	108·4	110·3	111·1	109·5

It will be seen that all the flocks taken together gave a slightly higher result than in preceding years. The outstanding feature of the returns, however, is the practical identity of the results—the figures being as follows :—

1911-12, and	1908-9	..	109·5
1912-13,	1909-10	..	111·1
contrasted,	1910-11	..	110·8
	1911-12	..	108·4
	1912-13	..	112·5

There are, however, some noteworthy variations in the results obtained by the various breeds. Thus, White Leghorns, after showing a decline, have the last two years done well, and Brown Leghorns have more than held their own during the five-yearly period. The excellent results shown by Minorcas have been already referred to. On the other hand, Faverolles have not been doing very well, but show some improvement this year. Buff Orpingtons are showing a fairly good result. Mixed Flocks are holding their own. Indeed, one of the features of these results is the comparatively good return shown by birds in Mixed Flocks; for although many of these birds are only mongrels, the results are not distinctly inferior to those shown for pure breeds.

So much for the general results, but poultry-keepers would do well to examine the records of each pen of birds, and not only the returns of the best pens. They should consider also the general averages shown by the breeds. Doing so will enable them more profitably to compare the different breeds, and will also bring out clearly the great value of strain as against breed. In fact, it will be evident that strain, as far as egg production is concerned, is at least as important as breed. An examination of the Tables shows that whilst the general averages of the various breeds are not very markedly different, and, as we have pointed out above, the mixed breeds gave results little inferior to those of pure-bred fowl, there are very great variations indeed between the results shown by the best-laying strains and the worst-laying strains. This can clearly be seen in the figures in Table A. A few salient facts may be pointed out. Thus, we have a flock of White Leghorns giving the good average of 180 eggs per bird per annum, as contrasted with another flock of birds of the same breed which yielded only 79 eggs per bird per annum. Similar variations are shown in other breeds. One flock of Mixed Breeds has the very good result of 173 eggs per bird per annum, and another flock has the poor result of 50 eggs per bird per annum. Again, one flock of White Wyandottes has the very good return of 181 eggs per bird, and another the bad result of 71 eggs per bird. A close examination of the returns will show many similar variations. It is not intended to claim that all the differences in results are solely due to strain, but the fact that such variations occur in all the breeds points to the conclusion that strain is the predominant cause of the wide variation.

The second lesson taught by the Tables is the great value of egg-laying records. For it will undoubtedly give food for thought when it is realised that one poultry-keeper may obtain an average yield of well over 200 eggs per bird per annum, while another poultry-keeper gets only

**The
Importance
of Strain.**

**The Value of
Records.**

about one-fourth that number of eggs. These figures, and others like them which occur frequently throughout the returns, will give a poultry-keeper, whose birds are showing results below the average, much reason to look carefully into his choice of birds and his method of keeping them.

An average of 112 eggs per annum—the general average shown for all birds in these returns—may be satisfactory up to a point, and it is undoubtedly above the general average of the country; but when results as high as those obtained by some of the more successful poultry-keepers can be attained, there is very considerable scope for improvement by the poultry-keeper whose results are only up to the average.

<p>It is not easy to estimate the average cost of a hen for a year, as conditions differ materially. For instance, on a farm hens pick up a good deal of food, and consequently they can be fed more cheaply than in cases where all their food has to be purchased.</p>	<p>Profit a farm hens pick up a good deal of food, and and Loss. consequently they can be fed more cheaply than in cases where all their food has to be purchased.</p>
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The cost of keeping hens will thus vary considerably—from very little to 6s. per hen per year. The variations of cost being so wide, it is difficult to strike an average. Probably the average hen costs, from first to last, from 3s. 6d. to 4s. per year for food. Just as the cost of keeping hens varies, so also the prices obtained for eggs differ considerably; but if the price received be taken at, say, 10d. a dozen all the year round, it will be seen that, to merely cover cost of food, a hen must lay about 60 eggs a year, and, if some slight profit and return for the care given is to be obtained, each hen should lay not less than 80 eggs per annum. Now, when we have in our returns a pen giving results as low as 50 eggs per annum, there is good reason to believe that there must be many flocks, or at least very many birds, giving averages below 60 eggs per hen per annum, and, therefore, hens which are being kept at no profit and perhaps at a loss. These considerations will show how important it is for every poultry-keeper to carefully watch the egg-production of his fowl, and the attention that should be given to the selection of birds of good egg-laying strains. Both these facts emphasise the necessity of keeping egg records.

As will be seen from the attached Tables (pp. 90 *et seq.*) a considerable number of egg records are being kept in Ireland, but it is very desirable that the number should be greatly increased.

The Department, therefore, wish to know of farmers and other poultry-keepers who are willing to keep Egg Records. An Egg Record Book in which returns can be kept will be sent free to all applicants. Applications, which need not be stamped, should be addressed to—The Secretary, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion Street, Dublin.

EGG RECORDS.—

SUMMARY

Name of Breed.	October.		November.		December.		January.		February.		March.	
	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.
White Leghorns, .	167	3.5	193	3.3	200	3.0	219	5.4	210	8.6	215	18.6
Brown Leghorns, .	60	1.4	75	1.3	75	5.8	71	8.1	71	14.7	70	20.5
Black Leghorns, .	3	0.0	3	11.0	3	16.3	6	7.2	6	13.5	8	16.3
Minorcas, .	50	9.4	53	10.2	52	11.6	52	15.0	53	16.6	48	23.5
Buff Orpingtons, .	140	5.8	155	2.9	150	5.4	160	9.5	165	10.8	180	14.7
White Orpingtons, .	112	3.8	122	3.5	129	5.2	128	6.8	119	8.9	116	15.9
White Wyandottes, .	377	6.2	399	4.2	433	4.1	421	6.1	404	7.8	396	14.5
Faverolles, .	197	2.8	200	3.0	210	3.8	202	5.8	226	10.6	236	16.2
Plymouth Rocks, .	449	4.6	499	2.9	508	4.3	567	5.6	553	9.9	559	15.4
Houdans, .	14	7.7	14	11.4	15	10.1	16	12.0	16	13.4	16	21.2
Rhode Island Reds, .	114	3.5	119	3.2	199	6.5	208	7.8	204	10.5	203	17.6
Light Sussex, .	119	2.4	125	2.7	202	3.0	199	5.2	208	10.7	214	14.4
Red Sussex, .	33	1.9	33	3.6	30	3.6	30	4.7	28	10.8	25	13.0
Mixed Breeds, .	3,024	4.2	3,170	3.4	3,311	4.6	3,292	7.0	3,455	8	3,471	14.6
Totals, .	4,859	4.3	5,160	3.4	5,517	4.6	5,571	6.8	5,718	9.9	5,735	15.2

SUMMARY TABLE SHOWING

	December Quarter	March Quarter
White Leghorns, .	9.8	32.6
Brown Leghorns, .	8.5	43.3
Black Leghorns, .	27.3	37.0
Minorcas, .	31.2	55.1
Buff Orpingtons, .	14.1	35.0
White Orpingtons, .	12.5	31.6
White Wyandottes, .	14.5	28.4
Faverolles, .	9.6	32.6
Plymouth Rocks, .	11.8	30.9
Houdans, .	29.2	46.6
Rhode Island Reds, .	13.2	35.9
Light Sussex, .	8.1	30.3
Red Sussex, .	9.1	28.5
Mixed Breeds, .	12.2	31.4

YEAR 1912-13.

TABLE.

April.		May.		June.		July.		August.		September.		Total of Monthly Averages.
Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	
224	20.2	222	20.7	206	16.2	187	14.6	177	11.1	167	9.0	134.2
70	21.5	60	20.6	50	17.5	50	16.7	50	13.9	50	7.6	149.6
6	16.7	6	15.6	6	14.7	6	13.8	6	9.3	6	3.5	137.9
46	21.8	45	21.1	43	22.1	41	19.6	39	20.0	38	13.8	204.7
160	13.3	160	11.9	119	11.8	119	10.7	119	9.5	119	7.6	113.9
111	15.0	111	14.8	101	11.7	94	12.0	107	7.1	115	4.1	108.8
401	13.4	366	12.2	357	10.4	320	9.3	309	7.4	301	6.6	102.2
285	15.8	267	15.5	278	10.6	254	7.2	235	6.7	256	4.4	102.4
551	15.9	520	14.0	487	10.9	471	9.5	465	8.1	477	6.2	107.3
18	21.5	17	21.8	14	14.5	16	12.0	15	8.1	15	4.8	158.5
205	16.5	200	16.0	193	12.0	186	10.6	178	9.9	181	8.2	122.3
209	13.4	177	11.7	163	9.4	152	9.0	145	7.2	145	6.2	95.3
25	13.3	25	13.9	25	8.6	25	8.0	25	5.0	—	—	—
3,023	15.5	2,723	14.7	2,672	12.5	2,335	10.1	2,207	8.5	2,146	7.2	112.1
5,334	15.6	4,899	14.8	4,714	12.2	4,316	10.2	4,097	8.5	4,016	7.0	112.5

QUARTERLY AVERAGES, 1912-13.

June Quarter.	September Quarter.	Total for Year.
57.1	34.7	134.2
59.6	38.2	149.6
47.0	26.6	137.9
65.0	53.4	204.7
37.0	27.8	113.9
41.5	23.2	108.8
36.0	23.3	102.2
41.9	18.3	102.4
40.8	23.8	107.3
57.8	24.9	158.5
44.5	28.7	122.3
34.5	22.4	95.3
35.8	—	—
42.7	25.8	112.1

WHITE LEGHORNS.

Number.	October.		November.		December.		January.		February.		March.	
	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.
1	6	7.0	6	1.0	6	0.2	—	—	6	0.0	—	—
2	27	4.2	36	4.9	44	4.6	44	3.7	45	6.8	45	14.0
3	20	0.0	21	0.0	19	1.2	20	5.5	15	7.4	17	17.1
4	28	5.1	35	4.2	35	3.0	34	6.3	34	9.4	34	22.7
5	33	4.5	33	2.8	33	3.2	33	6.3	22	16.6	33	23.9
6	31	0.3	32	3.3	33	0.7	33	2.8	33	2.5	33	16.8
7	22	6.0	30	3.5	30	4.9	29	9.9	29	15.7	29	21.6
8	—	—	—	—	—	—	26	3.9	26	6.4	24	14.0
9	—	—	—	—	—	—	—	—	—	—	—	—
Totals,	167	3.5	193	3.3	200	3.0	219	5.4	210	8.6	215	18.6

BROWN LEGHORNS.

1	17	1.2	32	1.0	32	3.9	31	8.6	31	16.3	30	21.5
2	43	1.5	43	1.5	43	7.2	40	7.7	40	13.4	40	19.8
Totals,	60	1.4	75	1.3	75	5.8	71	8.1	71	14.7	70	20.5

BLACK LEGHORNS.

1	3	0.0	3	11.0	3	16.3	6	7.2	6	13.5	6	16.3
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MINORCAS.

1	30	9.9	33	6.7	30	8.3	30	8.6	30	10.9	25	20.4
2	10	16.9	10	22.2	10	23.5	10	26.7	11	24.3	11	24.6
3	10	0.5	10	9.6	12	10.0	12	21.1	12	23.8	12	28.7
Totals,	50	9.4	53	10.2	52	11.6	52	15.0	53	16.6	48	23.5

WHITE LEGHORNS.

April.		May.		June.		July.		August.		September.		Total of Monthly Averages
Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	
—	—	—	—	—	—	—	—	—	—	—	—	—
45	18.4	43	24.0	30	12.3	27	11.8	25	13.6	25	9.5	127.8
17	15.5	15	14.1	15	8.3	17	8.0	14	2.1	15	0.3	79.5
44	20.0	44	20.9	44	23.0	34	25.5	30	23.2	18	16.9	180.2
33	24.7	33	22.2	33	16.0	33	16.2	33	15.1	33	8.0	159.5
33	18.5	33	15.2	33	11.7	29	11.2	29	13.2	29	10.8	107.0
29	25.4	29	20.3	29	21.7	27	14.0	27	8.3	27	10.1	167.4
23	17.4	21	16.6	18	12.3	16	7.1	15	10.4	16	5.5	—
—	—	4	20.0	4	16.8	4	18.0	4	9.0	4	3.2	—
224	20.2	222	20.7	206	16.2	187	14.6	177	11.1	167	9.0	134.2

BROWN LEGHORNS.

30	22.1	30	21.5	30	16.9	30	14.6	30	14.0	30	5.2	146.8
40	20.9	30	19.7	20	18.8	20	18.8	20	13.8	20	11.2	154.3
70	21.5	60	20.6	50	1.5	50	16.7	50	13.9	50	7.6	149.6

BLACK LEGHORNS.

6	16.7	6	15.6	6	14.7	6	13.8	6	9.3	6	3.5	137.9
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MINORCAS.

23	19.8	22	19.3	22	22.9	20	22.9	18	23.3	16	15.6	188.6
11	22.0	11	16.9	10	15.3	10	8.9	10	13.0	11	9.7	224.3
12	25.2	12	28.5	11	26.5	11	23.2	11	20.5	11	15.3	232.9
46	21.8	45	21.1	43	22.1	41	1.6	39	20.0	38	13.8	204.7

BUFF ORPINGTONS.

	October.		November.		December.		January.		February.		March.	
Number.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.
1	40	6.5	40	5.5	40	5.3	40	8.7	40	11.0	40	16.7
2	16	6.4	16	0.3	16	3.5	16	3.9	16	1.9	16	9.6
3	32	0.0	32	3.1	32	8.2	32	11.9	32	13.4	32	16.7
4	32	10.9	32	3.3	32	7.8	32	15.9	32	17.7	32	15.1
5	20	5.0	35	0.6	30	1.1	40	5.6	45	7.0	40	12.6
Totals,	140	5.8	155	2.9	150	5.4	160	9.5	165	10.8	160	14.7

WHITE ORPINGTONS.

1	16	7.4	24	5.8	31	6.0	30	8.8	24	13.5	22	15.3
2	30	6.8	30	5.8	30	7.7	30	10.0	30	11.4	30	14.8
3	36	1.6	33	1.3	33	1.6	33	1.4	30	4.3	29	20.1
4	30	1.4	35	1.9	35	5.7	35	7.5	35	7.6	35	13.7
Totals,	112	3.8	122	3.5	129	5.2	128	6.8	119	8.9	116	15.9

WHITE WYANDOTTES.

1	34	6.2	40	0.0	40	3.2	40	7.7	40	10.2	40	16.5
2	25	6.8	25	3.2	25	1.9	25	2.8	25	9.2	25	13.2
3	30	5.7	30	5.6	30	4.7	30	2.9	30	3.4	30	11.7
4	45	4.0	43	5.6	43	4.5	36	7.8	33	10.1	33	14.5
5	45	4.1	51	3.3	57	2.1	56	3.3	56	5.2	55	14.7
6	21	0.0	30	0.0	31	2.9	33	7.4	32	7.6	30	19.7
7	23	4.0	22	3.3	44	3.9	44	6.4	49	9.6	44	16.0
8	85	6.0	85	3.3	85	1.3	85	2.3	70	3.8	70	6.7
9	35	17.5	35	16.8	37	16.6	36	15.7	33	11.3	33	20.5
10	4	3.0	8	4.9	8	7.5	8	6.5	8	10.0	8	19.9
11	30	6.2	30	1.8	33	3.3	28	11.0	28	13.2	28	17.7
12	—	—	—	—	—	—	—	—	—	—	—	—
Totals,	377	6.2	399	4.2	433	4.1	421	6.1	404	7.8	396	14.5

BUFF ORPINGTONS.

April.		May.		June.		July.		August.		September.		Total of Monthly Averages.
Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	
40	13.4	40	12.2	40	13.7	40	13.1	40	11.9	40	8.4	126.4
16	9.8	16	9.6	15	5.5	15	4.5	15	3.4	15	5.1	63.5
32	17.3	32	16.3	32	12.2	32	9.5	32	6.8	32	6.1	121.5
32	14.0	32	13.7	32	11.7	32	12.0	32	12.3	32	9.2	143.6
40	10.8	40	7.5	—	—	—	—	—	—	—	—	—
160	13.3	160	11.9	119	11.8	119	10.7	119	9.5	119	7.6	113.9

WHITE ORPINGTONS.

18	17.3	19	15.2	16	17.7	16	16.2	18	9.8	18	11.8	144.8
30	15.6	30	15.2	25	13.6	20	17.1	30	11.8	30	4.1	133.9
29	15.5	29	15.4	28	9.9	27	10.1	29	2.6	37	1.0	84.8
34	12.9	33	13.7	32	8.6	31	8.1	30	5.1	30	3.1	89.3
111	15.0	111	14.8	101	11.7	94	12.0	107	7.1	115	4.1	108.8

WHITE WYANDOTTES.

40	14.7	40	10.0	38	15.2	38	10.5	38	6.6	38	5.2	106.0
38	11.8	38	11.7	38	8.5	25	12.3	25	12.0	20	17.9	111.3
30	12.8	30	9.3	30	5.3	19	3.7	19	0.0	19	6.3	71.4
54	13.9	54	10.8	52	4.3	49	9.0	45	9.8	44	9.6	90.1
30	13.0	30	9.1	30	10.1	27	9.1	17	5.2	17	1.0	85.1
43	14.3	39	13.0	36	11.6	30	11.9	34	8.4	30	5.5	107.9
70	8.3	65	15.6	62	14.9	62	10.8	62	9.2	62	6.3	88.5
33	20.5	33	17.1	33	17.4	33	10.3	33	9.2	33	9.0	181.9
8	15.3	8	15.7	8	13.6	8	11.1	8	2.7	8	4.4	114.6
26	18.1	—	—	—	—	—	—	—	—	—	—	—
29	12.5	29	9.3	30	3.8	29	2.6	28	0.2	30	0.0	—
401	13.4	366	12.2	357	10.4	320	9.3	309	7.4	301	6.6	102.2

FAVEROLLES.

Number.	October.		November.		December.		January.		February.		March.	
	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.
1	16	5.8	20	0.4	20	0.6	23	0.0	23	5.7	23	16.3
2	20	6.5	21	2.0	21	8.0	21	7.7	21	8.0	21	16.6
3	27	1.3	27	7.5	40	1.6	30	7.7	30	12.1	30	20.2
4	35	6.1	33	8.2	30	3.7	33	6.7	32	9.8	32	14.2
5	45	0.0	45	0.0	45	2.8	—	—	—	—	—	—
6	40	1.8	40	1.1	40	2.8	51	6.0	41	12.1	51	14.7
7	14	0.0	14	3.1	14	14.0	14	9.3	14	9.1	14	10.0
8	—	—	—	—	—	—	—	—	35	15.5	35	19.6
9	—	—	—	—	—	—	30	4.0	30	8.3	30	15.7
10	—	—	—	—	—	—	—	—	—	—	—	—
11	—	—	—	—	—	—	—	—	—	—	—	—
Totals,	197	2.8	200	3.0	210	3.8	202	5.8	226	10.6	236	16.2

PLYMOUTH ROCKS.

1	22	0.0	31	1.3	31	2.8	32	1.3	30	1.1	30	14.2
2	35	2.5	34	3.0	34	4.5	40	5.0	40	7.7	40	11.8
3	12	4.3	12	1.5	10	1.8	10	2.7	10	5.0	10	7.9
4	30	3.3	30	1.6	30	2.4	30	5.4	30	13.6	32	12.4
5	30	1.8	35	2.6	35	3.7	35	2.2	34	7.3	34	15.3
6	25	5.6	25	3.1	24	8.0	25	9.3	24	12.9	26	18.8
7	19	8.5	20	2.7	22	2.3	22	4.8	22	15.5	22	15.7
8	33	7.8	33	2.7	33	1.1	33	3.5	33	9.2	33	17.5
9	27	2.1	31	3.0	33	3.8	33	5.2	33	6.4	33	11.0
10	20	16.6	31	13.0	30	11.4	30	12.2	30	9.4	31	14.3
11	24	7.3	24	5.5	35	7.6	31	7.2	31	10.3	31	14.6
12	30	3.1	35	0.3	30	2.2	30	6.0	30	12.0	30	14.0
13	15	0.7	30	0.4	29	6.2	30	8.6	27	13.1	30	15.3
14	20	6.0	26	3.7	31	7.5	31	8.1	31	12.6	30	17.1
15	85	1.3	70	1.1	70	2.4	55	7.4	50	13.5	52	23.2
16	22	9.4	32	3.2	31	2.1	30	4.1	28	7.8	25	17.0
17	—	—	—	—	—	—	30	5.4	30	11.6	30	15.2
18	—	—	—	—	—	—	40	1.5	40	10.2	40	14.6
Totals,	449	4.6	499	2.9	508	4.3	567	5.6	553	9.9	559	15.4

HOUDANS.

1	14	7.7	14	11.4	15	10.1	16	12.0	16	13.4	16	21.2
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RHODE ISLAND REDS.

1	39	0.4	34	2.3	34	5.4	35	4.3	35	8.3	35	17.3
2	24	7.2	25	0.0	26	5.5	26	3.7	26	9.3	26	17.7
3	2	14.5	11	4.2	11	12.8	20	10.1	20	12.1	19	20.5
4	32	4.7	33	4.2	32	5.4	32	10.2	30	12.6	30	22.5
5	5	5.4	4	6.5	21	13.3	20	11.4	19	15.0	19	16.2
6	12	0.0	12	7.7	12	22.0	12	21.8	12	19.3	12	23.8
7	—	—	—	—	20	1.9	20	7.3	20	12.8	19	18.0
8	—	—	—	—	24	1.7	24	4.7	24	3.3	23	11.2
9	—	—	—	—	19	2.0	19	4.9	18	6.9	20	12.7
10	—	—	—	—	—	—	—	—	—	—	—	—
Totals,	114	3.5	119	3.2	199	6.5	208	7.8	204	10.5	203	17.6

FAVEROLLES.

April.		May.		June.		July.		August.		September.		Total of Monthly Averages.
Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	
24	13.8	24	12.1	18	12.2	16	5.2	18	8.1	16	1.1	81.3
21	13.2	21	11.5	20	4.5	21	1.6	20	4.5	20	7.2	91.6
45	14.1	30	16.9	30	14.5	30	12.5	30	5.5	30	3.8	117.7
32	16.5	32	16.6	32	2.5	32	2.6	32	6.4	30	5.4	98.7
—	—	—	—	—	—	—	—	—	—	—	—	—
51	15.6	51	15.1	51	11.1	51	6.8	51	4.6	68	1.8	93.5
10	15.2	10	15.5	9	12.3	9	9.0	9	6.7	9	5.4	109.6
45	16.7	45	15.5	35	12.4	35	5.8	35	7.5	35	5.9	—
30	15.1	30	13.9	30	11.4	30	9.8	30	7.8	23	6.9	—
27	21.6	24	21.0	23	12.0	—	—	—	—	—	—	—
—	—	—	—	30	13.6	30	11.1	30	10.8	25	5.5	—
285	15.8	267	15.5	278	10.6	254	7.2	255	6.7	256	4.4	102.4

PLYMOUTH ROCKS.

29	16.6	29	14.1	29	7.9	20	10.1	20	8.3	20	0.0	77.7
40	12.9	40	11.3	40	8.2	40	8.3	40	3.4	40	6.2	84.8
8	13.0	8	10.4	8	8.0	8	12.6	8	9.6	8	5.4	82.2
30	14.9	—	—	—	—	—	—	—	—	—	—	—
34	18.0	34	14.7	33	10.1	33	5.4	32	5.9	32	8.3	95.3
23	16.7	25	15.7	25	16.5	25	15.6	25	11.7	24	11.7	145.6
22	17.7	22	19.9	22	10.5	22	11.8	22	8.3	22	10.1	127.8
33	13.5	33	10.6	34	12.8	36	8.1	35	11.1	45	3.6	101.5
33	13.5	33	10.8	33	6.7	33	5.5	33	5.9	33	2.5	76.4
28	20.9	28	19.6	28	12.8	26	10.1	20	6.4	20	3.1	149.8
31	15.9	31	17.1	23	15.9	22	14.9	18	13.2	25	10.8	140.3
30	14.7	30	13.9	26	12.6	25	10.9	24	10.0	23	6.0	105.7
30	15.8	30	13.9	21	14.9	22	12.4	30	5.5	18	13.1	119.9
30	14.5	28	14.4	20	18.6	15	13.7	15	12.1	15	11.5	139.8
55	21.4	54	16.0	58	9.9	59	9.0	62	8.9	67	2.1	116.2
25	14.8	25	9.3	20	4.2	19	9.5	18	8.2	17	10.3	99.9
30	14.6	30	11.1	30	6.0	30	6.7	28	11.7	28	8.8	—
40	13.8	40	13.5	37	12.7	36	8.0	35	4.7	40	5.4	—
551	15.9	520	14.0	487	10.9	471	9.5	465	8.1	477	6.2	107.3

HOUDANS.

18	21.5	17	21.8	14	14.5	16	12.0	15	8.1	15	4.8	158.5
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RHODE ISLAND REDS.

35	18.6	35	19.4	30	14.9	28	13.9	28	14.1	36	7.1	128.0
26	18.5	26	15.1	26	7.7	26	4.5	26	8.6	26	8.5	106.3
19	19.9	18	15.6	17	10.9	17	10.9	17	11.7	17	8.5	151.7
30	13.1	30	16.6	30	12.2	30	11.6	30	10.7	30	9.4	133.2
19	16.1	19	15.3	19	9.7	19	8.5	19	4.2	19	7.8	129.4
12	21.9	12	18.4	12	17.4	12	17.1	12	12.3	12	9.0	190.7
18	16.6	17	16.0	17	11.3	16	12.1	17	9.5	15	8.0	—
22	10.8	20	12.5	19	12.2	15	10.5	10	5.9	8	5.7	—
20	13.1	19	13.3	19	11.5	19	10.7	19	8.9	18	6.0	—
4	29.0	4	16.0	4	15.3	4	3.0	—	—	—	—	—
205	16.5	200	16.0	193	12.0	186	10.6	178	9.9	181	8.2	122.3

LIGHT SUSSEX.

Number.	October.		November.		December.		January.		February.		March.	
	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.
1	27	2.1	28	2.0	45	1.6	42	4.7	41	8.2	41	10.8
2	15	1.4	15	6.3	15	3.5	15	3.6	35	11.4	35	15.9
3	20	3.5	20	2.3	20	3.8	20	7.4	20	8.2	20	10.1
4	7	8.3	6	10.3	24	6.9	24	10.0	24	11.3	22	13.2
5	30	0.6	36	0.0	36	2.8	36	3.4	36	13.7	36	20.1
6	20	2.9	20	4.1	30	4.8	30	9.1	30	16.3	28	17.8
7	—	—	—	—	32	0.0	32	0.4	32	6.3	32	11.5
Totals,	119	2.4	125	2.7	202	3.0	199	5.2	208	10.7	214	14.4

1	33	1.9	33	3.6	30	3.6	30	4.7	28	10.8	25	13.0
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MIXED BREEDS.

1	25	4.6	23	1.2	24	3.5	24	3.0	25	2.9	24	9.7
2	22	6.6	22	2.2	26	6.0	23	1.0	21	9.3	20	13.2
3	71	3.7	68	1.1	60	1.5	56	6.9	62	7.9	62	12.8
4	27	1.7	27	1.6	27	1.7	—	—	32	6.5	—	—
5	30	2.6	74	2.1	75	4.9	75	7.8	75	10.0	83	13.8
6	23	0.0	23	0.0	23	0.0	—	—	—	—	—	—
7	50	3.3	50	0.7	55	1.4	55	11.2	55	11.4	55	16.9
8	76	5.4	81	3.1	83	3.9	75	8.3	78	12.1	76	19.3
9	57	4.7	60	2.4	57	2.5	57	2.8	52	8.8	50	13.5
10	40	0.9	45	0.5	45	2.0	39	7.8	45	9.0	45	12.1
11	27	5.1	26	3.3	26	3.9	26	10.0	41	9.5	42	15.3
12	110	5.1	70	3.6	60	4.5	60	5.6	70	9.8	80	14.4
13	61	1.0	61	0.2	61	0.2	61	0.4	41	1.4	60	7.0
14	50	7.3	55	5.2	59	6.5	58	15.1	64	13.7	63	14.8
15	43	8.8	40	9.7	42	6.1	40	7.8	38	10.1	37	13.3
16	50	0.0	50	0.0	63	2.3	50	7.9	60	9.3	60	10.8
17	38	0.3	46	5.0	45	8.5	44	9.7	50	15.1	48	15.9
18	40	3.2	40	6.1	40	5.5	40	9.3	45	11.6	43	14.1
19	116	4.6	71	2.4	70	2.3	71	6.2	69	13.0	72	15.0
20	28	4.7	28	4.5	32	3.4	—	—	—	—	—	—
21	25	2.4	25	1.6	25	0.8	25	6.1	24	3.4	23	6.7
22	60	0.9	50	0.9	50	3.5	50	6.1	50	10.0	50	20.0
23	26	6.7	26	10.4	26	11.8	25	13.7	25	13.4	24	19.3
24	22	6.4	22	5.2	22	5.8	22	3.9	22	5.5	22	6.9
25	16	6.0	16	3.4	16	5.9	16	11.4	16	11.7	23	16.4
26	45	2.5	47	0.9	32	3.1	37	3.0	20	7.6	12	13.3
27	40	8.9	45	0.0	45	7.4	45	8.4	54	13.1	45	17.5
28	120	4.4	120	3.3	120	3.8	110	6.2	140	8.3	160	13.5
29	30	6.6	30	5.9	30	4.6	30	8.4	60	11.2	60	16.0
30	53	1.7	52	1.8	59	4.2	64	7.2	65	12.4	64	12.3
31	50	1.9	50	1.5	50	2.2	50	2.8	48	6.4	48	14.8
32	52	0.3	49	0.2	59	2.3	70	4.8	68	8.9	61	16.0
33	30	8.4	31	6.0	32	3.7	35	5.7	38	9.2	38	17.8

LIGHT SUSSEX.

April.		May.		June.		July.		August		September.		
Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Total of Monthly Averages.
35	10.9	37	9.9	30	3.4	22	3.5	22	2.9	20	4.1	64.1
35	17.1	35	13.2	35	9.2	35	11.2	30	8.3	30	4.6	105.7
20	9.4	20	7.5	20	7.4	19	6.4	18	6.0	18	5.9	77.9
24	13.7	24	12.1	15	17.0	15	7.1	15	12.1	15	9.6	131.6
36	11.1	36	9.9	36	8.9	35	6.2	35	4.0	36	4.1	84.8
27	21.0	25	18.0	27	14.5	26	17.7	25	12.4	26	11.1	149.7
32	10.6	—	—	—	—	—	—	—	—	—	—	—
209	13.4	177	11.7	163	9.4	152	9.0	145	7.2	145	6.2	95.3

RED SUSSEX.

25	13.3	25	13.9	25	8.6	25	8.0	25	5.0	—	—	—
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MIXED BREEDS.

34	15.6	34	14.9	34	7.2	34	10.1	36	9.9	34	8.1	90.7
15	12.9	17	11.0	—	—	—	—	—	—	18	2.2	—
62	15.0	62	15.4	52	16.0	64	10.4	66	7.0	66	4.2	101.9
—	—	—	—	—	—	—	—	—	—	—	—	—
83	14.6	50	19.7	50	15.1	50	11.4	50	5.4	50	5.4	112.8
—	—	—	—	—	—	—	—	—	—	—	—	—
55	20.0	55	19.5	75	15.4	55	15.6	55	19.2	55	19.5	154.1
76	20.1	76	21.1	70	19.7	68	16.6	64	14.6	56	13.7	157.9
50	15.0	49	16.4	47	13.5	46	10.4	45	8.4	42	8.0	106.4
45	10.0	—	—	—	—	—	—	—	—	—	—	—
42	15.6	39	8.7	32	10.8	—	—	—	—	28	9.2	—
80	15.7	76	16.3	80	20.6	80	12.7	84	11.2	85	11.7	131.2
32	13.8	32	3.3	30	6.5	30	3.9	30	6.4	34	6.0	50.1
60	13.5	—	—	—	—	—	—	—	—	—	—	—
34	12.7	32	12.6	30	11.3	27	9.9	27	5.5	25	3.7	111.5
60	17.5	—	—	60	8.3	70	11.5	—	—	—	—	—
48	16.6	48	13.1	48	10.6	46	3.3	40	4.6	38	3.5	108.2
42	18.6	42	16.2	38	11.7	35	8.3	35	14.0	35	7.9	126.5
67	14.6	67	14.0	67	14.6	67	12.7	69	9.9	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—
22	9.7	21	9.7	20	9.1	20	6.4	22	4.9	22	5.9	66.7
50	17.8	50	12.8	50	9.4	50	8.8	50	5.4	50	2.6	98.2
25	14.5	25	15.4	25	10.5	25	14.0	24	12.5	24	11.9	154.1
21	6.9	20	8.1	17	8.0	26	4.5	—	—	—	—	—
23	21.0	23	21.0	23	16.2	15	17.0	20	9.2	23	3.3	142.5
12	13.6	12	15.1	12	8.4	12	10.3	12	9.2	13	4.7	91.7
—	—	—	—	—	—	—	—	—	—	—	—	—
101	21.1	140	15.1	140	11.7	—	—	—	—	—	—	—
60	17.3	50	15.5	50	15.4	40	6.6	40	5.7	40	6.5	119.7
59	10.8	57	10.4	45	13.0	39	7.1	50	6.8	48	6.0	93.6
44	18.9	45	17.0	45	9.8	44	5.3	—	—	—	—	—
62	13.0	51	15.8	42	11.4	42	9.4	41	10.5	40	11.4	104.0
37	13.2	35	5.1	32	12.2	33	8.3	32	8.5	31	6.3	104.4

MIXED BREEDS.

Number.	October.		November.		December.		January.		February.		March.	
	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.
34	48	3.8	46	1.0	43	1.7	38	2.1	36	4.1	36	13.7
35	60	6.4	65	5.7	65	5.7	65	7.0	65	10.0	60	21.0
36	15	10.3	15	5.1	18	5.6	20	12.7	20	12.4	27	15.1
37	36	4.9	36	7.4	36	7.6	36	8.8	36	13.3	30	21.2
38	26	0.5	26	1.7	24	5.8	23	6.0	24	10.5	23	12.7
39	41	3.2	31	3.6	40	6.6	40	8.1	38	11.4	40	16.8
40	29	6.2	29	2.3	29	1.7	28	2.6	29	7.8	31	12.9
41	65	3.2	54	5.6	65	6.9	100	7.4	100	9.9	105	14.3
42	34	3.6	31	4.2	37	8.8	40	7.9	43	8.2	45	13.0
43	60	2.9	60	1.4	60	4.3	60	1.4	60	11.0	60	24.2
44	75	2.0	77	3.8	79	3.7	81	5.6	79	5.8	79	8.3
45	9	0.0	20	0.0	11	0.0	16	0.4	19	6.3	10	14.6
46	40	2.8	40	2.8	40	1.9	40	3.6	40	4.0	44	8.8
47	36	19.2	36	16.1	36	0.0	36	6.9	52	7.1	52	13.0
48	40	2.3	50	3.8	60	6.5	60	6.8	60	9.5	60	15.2
49	44	0.0	44	0.8	43	4.6	42	7.0	44	8.6	44	14.1
50	32	1.5	38	3.5	40	5.9	40	9.5	37	12.0	37	14.7
51	50	3.9	50	4.1	50	7.0	54	5.5	50	5.1	50	8.6
52	26	7.4	25	2.9	27	4.7	32	8.2	34	14.4	44	14.4
53	68	5.1	71	2.4	85	5.5	96	7.8	98	9.5	100	15.6
54	18	5.4	24	1.0	24	5.2	18	15.5	18	14.8	30	9.3
55	50	1.2	50	5.6	70	5.6	70	7.4	75	10.3	70	14.1
56	60	6.8	60	4.0	60	6.4	70	9.7	82	12.0	82	16.0
57	48	6.1	60	4.9	60	9.0	68	9.2	69	10.6	70	15.8
58	18	7.3	17	8.6	30	6.0	30	11.7	29	14.6	28	20.3
59	75	5.5	79	4.5	84	3.7	83	3.8	83	9.3	83	15.3
60	59	6.8	56	7.5	58	9.5	61	11.1	58	16.0	58	19.5
61	26	0.6	31	0.0	26	0.0	26	4.1	26	9.1	26	14.1
62	30	2.3	30	1.4	30	3.2	31	6.1	31	8.6	25	14.4
63	70	5.8	70	5.5	100	5.6	100	8.3	90	12.8	86	23.7
64	65	3.4	50	2.4	50	6.3	50	6.8	50	6.9	50	10.7
65	23	5.9	23	3.6	26	8.7	30	7.7	30	8.2	30	11.8
66	46	3.8	44	1.3	46	2.2	48	6.7	48	6.4	50	9.5
67	35	2.0	35	1.1	42	1.3	38	3.9	38	5.3	35	17.7
68	14	8.5	14	7.7	21	7.7	21	6.8	21	13.4	20	18.0
69	—	—	40	10.2	37	4.1	37	5.2	46	8.8	50	12.7
70	—	—	50	3.7	50	7.0	52	8.4	54	10.8	53	13.5
71	—	—	30	4.0	30	6.9	30	9.5	30	12.5	30	21.0
72	—	—	40	3.6	40	4.5	49	9.4	60	12.8	65	13.4
Totals,	3,024	4.2	3,170	3.4	3,311	4.6	3,292	7.0	3,455	9.8	3,471	14.6

MIXED BREEDS.

April.		May.		June.		July.		August.		September.		Total of Monthly Averages.
Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	
60	24.8	60	28.0	60	22.1	60	17.3	60	12.3	60	12.8	173.1
30	13.4	30	7.5	29	5.9	29	10.0	29	7.2	29	5.8	111.0
30	18.5	24	19.0	24	17.4	24	13.3	20	4.8	20	10.3	146.5
23	9.1	23	9.5	25	5.5	24	0.0	24	0.0	24	4.0	65.3
40	17.2	40	18.0	40	15.2	—	—	—	—	—	—	—
32	15.4	31	13.8	30	16.8	33	13.4	30	11.4	29	8.4	112.7
—	—	—	—	—	—	—	—	—	—	—	—	—
47	13.1	46	11.5	45	8.7	44	4.7	45	2.9	47	2.1	88.7
—	—	—	—	—	—	—	—	—	—	—	—	—
65	9.7	66	9.3	67	7.7	73	8.1	50	4.4	90	3.2	71.6
11	15.5	11	16.2	—	—	—	—	—	—	—	—	—
44	11.5	40	18.6	35	7.6	30	2.3	30	4.8	30	7.9	76.6
42	14.6	36	13.3	33	11.6	30	12.1	30	10.0	30	4.1	128.0
50	19.1	57	11.3	40	12.1	40	9.9	30	13.0	39	8.6	118.1
—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—
48	13.9	44	16.1	50	15.8	50	11.5	40	8.4	50	6.3	106.2
44	15.6	43	13.2	42	13.2	40	14.7	34	14.0	33	11.8	134.5
100	15.9	86	17.3	78	13.8	76	13.0	76	11.0	75	6.3	123.2
26	13.9	28	11.6	27	12.5	28	8.3	28	9.3	28	6.4	113.2
80	14.0	70	15.5	70	10.1	70	5.9	70	5.0	50	5.8	100.5
80	16.7	80	13.8	75	9.5	60	9.7	60	10.1	60	6.2	120.9
73	16.0	70	16.0	67	13.7	67	11.7	66	7.8	68	7.3	128.1
26	21.2	26	19.4	25	17.1	24	14.6	23	7.9	21	4.2	152.9
81	14.4	81	12.2	83	9.5	83	8.5	91	6.2	90	4.7	97.6
58	18.1	56	19.9	54	19.6	53	16.0	51	14.1	50	13.5	171.6
36	13.6	29	10.5	28	5.8	39	4.1	35	4.5	37	3.7	70.1
25	18.2	25	20.3	25	15.1	25	7.8	25	11.3	25	12.3	121.0
86	20.1	86	12.7	70	15.1	50	13.7	70	8.6	70	7.5	139.4
50	7.5	50	7.9	50	3.3	50	3.7	50	2.6	50	1.7	63.2
29	13.3	27	13.0	26	13.1	22	14.0	17	14.0	20	14.1	127.4
50	10.0	38	16.4	34	12.4	40	9.0	30	6.8	30	6.7	91.2
35	15.9	35	16.3	35	14.4	39	9.9	38	8.1	35	6.3	102.2
20	17.6	20	15.3	18	17.6	18	11.4	15	12.5	24	8.0	144.5
35	9.9	—	—	45	6.9	40	7.9	40	4.0	—	—	—
52	13.6	51	13.0	51	10.0	51	9.9	—	—	—	—	—
50	12.8	50	13.1	50	11.1	24	11.0	25	9.4	30	4.5	—
61	17.4	56	17.0	47	13.3	41	7.7	43	8.2	45	7.5	—
3,023	15.5	2,723	14.7	2,672	12.5	2,395	10.1	2,207	8.5	2,146	7.2	112.1

AVONDALE FORESTRY STATION.

GENERAL DESCRIPTION AND PROGRESS OF WORK, 1906-12.

By MR. A. C. FORBES, F.H.A.S., M.R.I.A., *Inspector of Forestry.*

The development of Irish Forestry being one of the functions allocated to the Department of Agriculture and Technical Instruction for Ireland, steps were taken in the year

Introduction. 1908 to establish a School for working foresters in which young men could be trained in the various operations connected with the formation of plantations, and their subsequent care and management. Inquiries were made with a view to purchasing a wooded estate in a suitable centre in Ireland, and several localities were inspected in the Counties of Wicklow, Waterford and Tipperary.

It was finally decided to purchase the Avondale Estate, near Rathdrum, County Wicklow, the old home of the late Charles Stewart Parnell, and formerly the property of Samuel Hayes, an enthusiastic tree planter and the author of a book entitled *Planting*, published in 1794. Most of the older timber and ornamental trees at Avondale were planted during Hayes' time, and the dimensions of the largest of these are given in the course of this article. Exclusive of tenanted holdings and outlying portions of the property unsuitable for afforestation, this estate contained a fairly large mansion and outbuildings, about 200 acres of unplanted grass land, and over 300 acres of woodland. A further advantage connected with Avondale was its position in the centre of a well wooded district, and the proximity of the Wicklow Mountains, in which forestry operations on a large scale will probably be carried out in the future.

In addition to the training of foresters, it was also felt that experiments were needed to test the suitability of various forest trees for commercial planting in Ireland. Many species of recent introduction, which might possibly prove of value for future use, have not hitherto been planted on silvicultural lines, and it is consequently impossible to say how far their use in economic forestry would be advisable. One of the chief objects of the Station is to furnish information on this point, and also to prove, as far as this can be done in one place, and on a limited area, the cost of production, yield in timber, and comparative market value of the species planted. As regards the cost of production on a large scale, this must vary from time to time with the abundance or scarcity of seed, and to a certain extent depend upon climatic variations, which

favour or retard the propagation and development of seedlings and transplants. Accordingly, no absolutely exact figure can be arrived at which would be of practical value. But it is hoped that data for determining the yield and commercial value of most of the species being experimented with may be obtained from the forest plots, and the Station thus serve as a base from which calculations and forecasts may be made for other parts of Ireland.

Upon the estate being acquired, steps were taken to render the mansion house suitable for the lodging, boarding, and instruction of apprentices, and to lay out the land as a demonstration and experimental area which might prove of service, not only for educational and training purposes, but as one which tree planters throughout Ireland could inspect at any time.

**General
Features
of Station.**

Over 100 acres were planted in the form of sample plots, of which a detailed description is given below, and the remainder of the land was laid out for planting or re-planting according to soil and situation. In addition to the larger plots, a number of groups and clumps of the rarer species, or those obtained from special strains of seed, were planted in corners and spaces between the plots, and these will in time occupy the whole of the ground available for planting. An arboretum and pinetum, which contain specimens of the more important trees and shrubs suited for ornamental planting in Ireland, were also planted near the mansion house. A walled-in garden of two acres has been turned into a nursery, and seedlings of the more expensive species are raised for planting in other parts of Ireland. During the period 1906-12, 120 acres of sample plots and 80 acres of cleared woodland were planted or re-planted, and the work is now proceeding at the rate of 10-20 acres annually.

The original idea associated with the formation of the forest plots was the creation of a series of typical forest groups, by means of which the growth of all important species could be demonstrated to working foresters. Combined with theoretical instruction in the class-room, the work of the apprentices during the first five years has chiefly been the laying out and planting of a sufficient number of these demonstration plots, and they may now be regarded as well established. In addition to the more utilitarian object aimed at in this connection, the Station is also being made a trial ground for every exotic species of tree likely to reach timber size in the country. Most of the rarer species have been planted in small clumps or groups, in which some approach to silvicultural conditions will be attained in the future, while all will have an opportunity of developing as specimen trees if suited to the climatic conditions. These rarer species are constantly being added to from

time to time, and it is hoped that the Station will eventually enable a decision to be arrived at regarding the value of all arboreal species capable of growing in Ireland.

The buildings utilised in connection with the School are the mansion house, in which are the class-rooms, library, museum, and quarters for the students and staff, and an out-building used

Buildings and Equipment. as a laboratory and store-house for seeds and tools. The library contains most of the principal works on forestry and arboriculture, and a number of text-books on elementary science and miscellaneous subjects. It also serves as a reading and recreation room.

A museum collection is being gradually formed, and includes specimens of Irish-grown timbers in plank and cross-section, forest tools and appliances, and specimens of various articles made from wood and other forest products.

Specimens of leaves, flowers, fruits and seeds of forest trees, tree diseases, injurious insects and fungi, are set up in one of the rooms of the mansion house.

The main portion of the present property forms a long, narrow strip adjoining the River Avonmore, beginning about a mile south of Rathdrum and extending to the Meeting of the

Description of Site, Suitability for Tree Growth, etc. Waters at the head of the Vale of Avoca. The general configuration of the ground is that of a river valley varying in width and extending back at the northern end to the level of an undulating tract of country which lies between the river and the Wicklow Mountains to the west.

In earlier times two alluvial deposits were formed by the river, which now consist of level tracts of sandy soil about 5 or 6 acres in extent. With these exceptions, the soil of the entire Station is derived from the underlying rock. The elevation varies from 200 to 450 feet above sea level, and the surface is nowhere greatly exposed to prevailing westerly winds.

The suitability of the site for tree growing may be gauged by the size attained by most of the commoner forest trees on the estate. Beech, oak, larch, spruce, silver fir, etc., of large size were scattered over the demesne at the time of its acquisition, and wherever possible the finest of these were preserved. The more valuable timber throughout the woods, which originally consisted of mixed conifers and broad-leaved trees of good quality, had been cleared off several years previously, a sawmill having been worked for many years in connection with the woods.

Of the trees now remaining, the dimensions of the largest, the ages of which vary from 120 to 150 years, are as follows :—

SPECIES.	Height.	Girth at 4½. Feet	
	Feet	Ft.	Ins.
Silver Fir (1)	132	17	6
„ (2)	130	15	0
„ (3)	100	14	4
Larch	84	9	8
Spruce	120	9	0
Scots Pine	56	9	2
English Elm	90	12	0
Wych Elm	80	9	6
Oak (Sessile)	86	10	10
„ (Turkey)	60	11	10
Spanish Chestnut	75	14	4
London Plane	70	10	4
Yew	40	10	0
Beech; a number of large spreading trees, with heights of 60 to 90 feet, and girths of 12 feet to 16 feet.			

The local climate is typical of the greater part of Ireland, and possesses an average rainfall of about 40 inches, or rather more than the average for the eastern counties.

Climatic Features. The most prominent local climatic features, apart from the rainfall, are the frequency and intensity of late frosts in May and June, which greatly retard the development of tender species.

The average mean monthly temperature, rainfall, and other data, during the last five years are given for the four summer months in the following tables :—

TEMPERATURE AND RAINFALL RECORDS, 1908-1912.

MEAN MAXIMA AND MINIMA TEMPERATURES (Fahrenheit Scale).

	May.		June.		July.		August.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1908 ..	63	44	66	47	69	49	67	48
1909 ..	60	39	62	43	67	50	69	48
1910 ..	61	41	67	47	67	47	67	50
1911 ..	63	41	67	46	74	50	72	51
1912 ..	63	45	65	49	67	51	65	46

ABSOLUTE MAXIMA AND MINIMA IN SCREEN.

		May.		June.		July.		August.	
		Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1908	..	77	34	82	36	81	40	81	41
1909	..	74	25	71	36	78	40	83	40
1910	..	75	30	79	41	77	40	75	42
1911	..	74	33	79	33	83	40	86	42
1912	..	71	31	72	38	74	38	70	36

ABSOLUTE MINIMA ON GRASS.

		May.	June.	July.	August
1908	..	—	—	—	—
1909	..	—	—	—	—
1910	..	23	28	32	32
1911	..	25	20	30	32
1912	..	22	28	28	27

THE LOWEST WINTER TEMPERATURES RECORDED WERE :—

			In Screen.	On Grass.
1908	..		19	—
1909	..		11	—
1910	..		15	12
1911	..		19	12
1912	..		17	5

MONTHLY RAINFALL (INCHES).

		May.	June.	July.	August.
1908	..	3.22	1.78	3.20	4.04
1909	..	1.45	3.51	2.30	1.24
1910	..	2.00	4.74	2.96	5.60
1911	..	1.45	2.13	2.84	2.56
1912	..	1.17	4.82	4.85	6.67

The soil over the greater part of the Station consists of a light loam, resting on metamorphosed schist, or clay slate, and generally well drained. Patches of clay, or clayey loam, occur here and there, while two small areas of alluvial gravel and sand have been formed adjoining the River Avonmore.

Soil.

AVONDALE FORESTRY STATION.



Fig. 1.—Avondale House.

AVONDALE FORESTRY STATION.

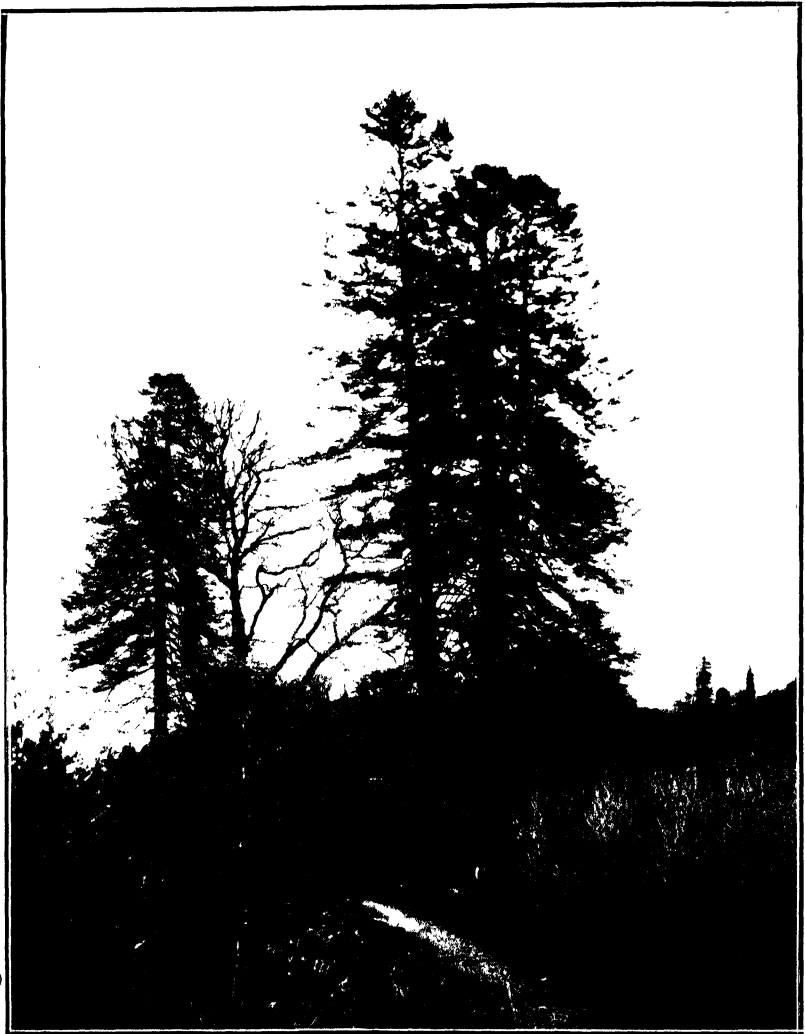


Fig. 2.—Silver Fir near River.

While the soil conditions are generally favourable for almost all species of hardy trees, they are more particularly suited to those liking a dry, well-drained soil. Very little soil exists sufficiently damp to suit poplars, willows, alders, etc., and species of these genera have been confined to small clumps which may not show a normal development after the first few years.

In 1911 the Geological Survey of Ireland took samples of the soil for analysis from seventeen plots, and five samples from the broad ride intersecting the plots, the main object being that of enabling a comparison to be made between the present mechanical, physical and chemical condition of the soil under grass, and its condition after a complete canopy and humus layer have been formed on the surface.

The following are mechanical and chemical analyses of three samples, representing light loam, clay and sand, respectively:—

CHEMICAL AND MECHANICAL ANALYSES OF TYPICAL SOILS.

	Taken at depth of 9-18 inches.		
	Light Loam (1).	Clay (9).	Sand (20).
	per cent.	per cent.	per cent.
CHEMICAL			
Nitrogen	·234	·51	·311
Phosphoric Acid	·347	·135	·135
Potash	·165	·164	·138
Calcium Carbonate	·17	·13	·15
MECHANICAL			
Above 1 cm. diam.	3·90	—	12·4
1 cm. to 2 mm.	20·00	1·1	14·8
2 mm.—·001	76·10	98·9	72·8
Detailed Analyses of portion passing 2 mm. sieve			
2 -1 mm.	11·23	1·20	16·10
1 -·2	8·28	3·50	23·90
·2 -·05	8·60	6·50	17·50
·05 -·01	15·71	14·60	9·49
·01 -·002	32·10	36·20	16·80
·002-·001	12·60	11·50	6·40
Hygroscopic Moisture	4·30	9·10	3·20
Loss on Ignition	7·30	18·30	8·20

All the above samples indicate a low proportion of calcium carbonate, but an average percentage of other chemical constituents of importance to plant life.

In laying out the experimental plots, the higher ground was roughly bisected by a broad glade 3 chains in width. On either side of this glade a row of trees, in which each tree represented the species present in the plots behind, was planted $\frac{1}{2}$ chain from the edge of the plots, leaving a breadth of 2 chains between the two rows. Right and left of this glade plots 10 chains in length and 1 chain in width, forming as nearly as possible 1 acre, were laid off, the narrow side of each plot adjoining the edge of the glade. The plots adjoining this glade were arranged in ten main groups or sections, the four at the north end consisting of broad-leaved species, the six at the south end of conifers.

Other sections were formed in a similar way on the slopes and low ground near the river, but owing to the irregularity of the ground plots of equal size could not be always arranged. The main idea in all cases, however, has been the formation of plots which would ultimately produce compact blocks of each species, in which growth would proceed under sylvicultural conditions, leading to the production of crops on definite areas which would facilitate periodical measurements being made.

The total number of sections and plots is given in the following Table:—

Section.	General.	Number of Plots.	Total Area.
			Acres.
I.	Maples (<i>Acer</i>)	4	3
II.	Elms (<i>Ulmus</i>)	4	3
III.	Beech, Spanish Chestnut, and Hornbeam (<i>Opuntiferae</i>)	8	8
IV.	Oaks (<i>Quercus</i>)	14	13
V.	Silver Firs (<i>Abies</i>)	7	7
VI.	Spruces (<i>Picea</i>)	7	7
VII.	Pines (<i>Pinus</i>)	14	12
VIII.	Larches (<i>Larix</i>)	7	14
IX.	Cedars (<i>Oedrus</i>)	2	2 $\frac{1}{2}$
X.	Ashes (<i>Fraxinus</i>)	9	6 $\frac{1}{2}$
XI.	Chestnut Coppice	1	11
XII.	Locust Tree Coppice	1	6
XIII.	Douglas Firs (<i>Pseudo-Tsuga</i>)	2	7
XIV.	Hemlock Spruces (<i>Tsuga</i>)	2	3
XV.	Cypresses and Junipers	3	3
XVI.	<i>Thuia</i> , <i>Sequoias</i> , and <i>Cryptomeria</i>	4	4
XVII.	Hickories, Walnuts, London Plane, Tulip Tree, etc.	10	5
XVIII.	Cherries (<i>Prunus</i>)	2	4
XIX.	Poplars (<i>Populus</i>).. .. .	3	2
		104	121 $\frac{1}{2}$

AVONDALE FORESTRY STATION.



Fig. 3.—Plot 7, Section III. Hornbeam and Larch.

AVONDALE FORESTRY STATION.

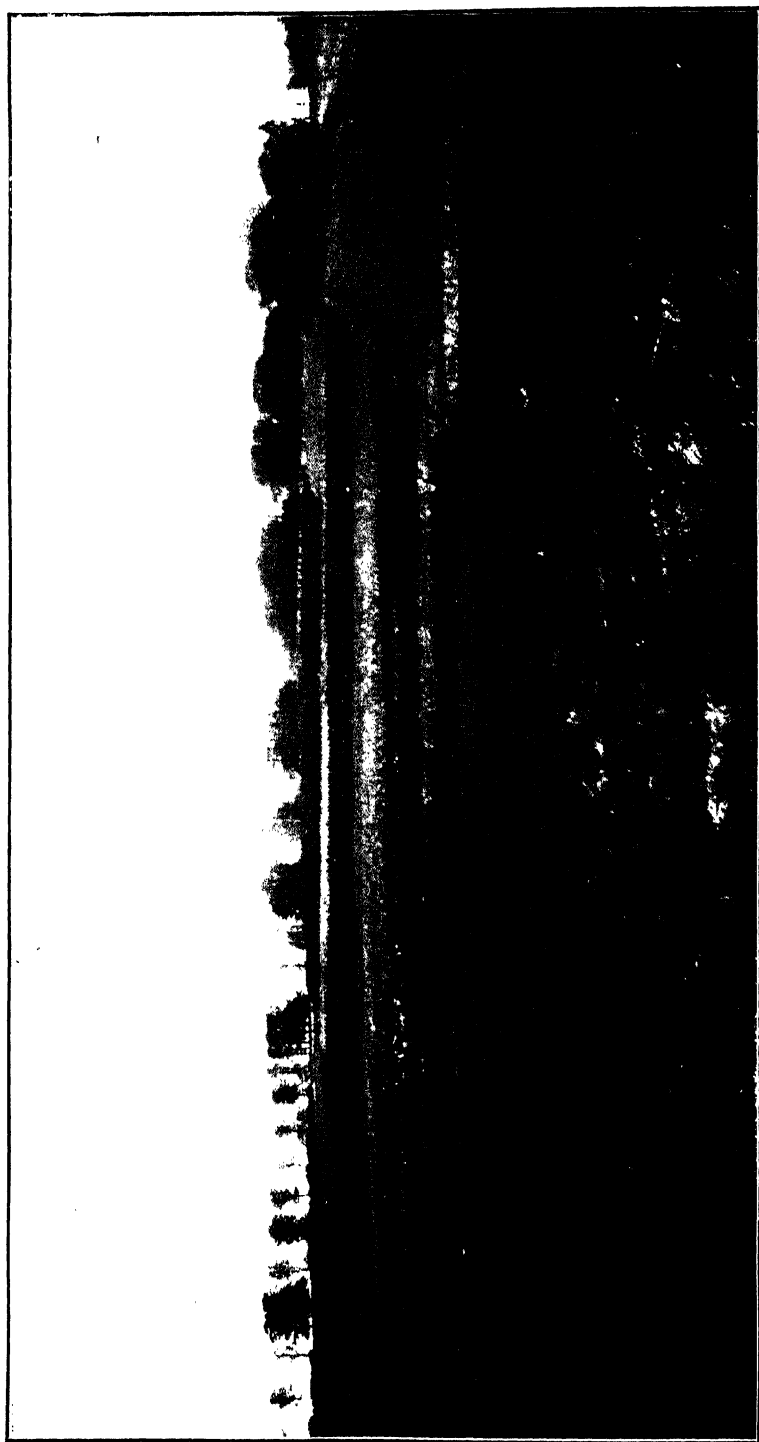


Fig. 4.—General View of Plots.—Sections II. a d III.

Although an attempt was made to allot ground for each section which would be best adapted for the species it contained, the comparatively uniform character of the soil in the first place, and the varying tastes of the individual species of a genus or natural order in the second, prevented this idea being carried out fully without altering the entire system of arrangement. The growth of certain species may, therefore, not equal that usually made by them in more congenial soils and situations, but the soil generally is sufficiently deep and good to prevent their entire failure, and will probably not affect their value for educational purposes.

In the future treatment of the plots it is proposed to divide each plot transversely into three divisions, the divisions nearest the main ride being gradually cleared of nurse trees and left pure. The central division will be left as near as possible untouched, except to take out bad or diseased trees as they occur. The third division will be thinned on ordinary lines, leaving a mixed crop of nurses and main crop species, according to the individual development of the trees. Periodical measurements will be made, and a record kept of material removed, rate of growth, and changes in the composition of the crops, etc.

In adopting the various mixtures when planting the plots, the general objects in view were as follows :—

- | | |
|--|--|
| Methods of
Mixing and
Grouping. | (a) The introduction of the species intended to represent the main crop, so as to form at least 25 per cent. of the total number planted. At a general planting distance of 4 feet apart this would provide 680 main crop trees at 8 feet apart per acre. |
| | (b) The introduction of species as nurses, either closely allied to that forming the main crop, or capable of being turned to account at an early age, such as larch. These nurses were intended not merely to draw up or nurse the main crop, but also to enable planting to be carried out at a cheaper rate than if the more expensive species alone formed the crop. |
| | (c) The use of the two most common nurse trees, larch and spruce, as nurses to all the important forest trees, so far as space would allow. |
| | (d) The planting of pure crops of all important species side by side with the same species in mixture, with a view to noting their development under both conditions. |

The majority of the nurse trees used were larch and spruce in the broad-leaved plots, and also in a large number of the coniferous mixtures. Scots pine was used as a nurse for most of the scarcer

pinus, and common silver fir for the silver fir section. Beech was used with larch and oak; ash with oak, walnut, American ash, hickory, tulip tree, etc. In most cases larch has already outgrown all other species, and the pruning back of side branches has become necessary. As a nurse, the common silver fir is a complete failure, owing to spring frost damage, while ash has also failed in some places for the same reason. It is expected, however, that these species will gradually get above the spring frost line, and, ultimately, serve the purpose intended. In the meantime, they demonstrate the importance of mixing these tender species with a quick-growing shelter tree such as larch, birch, or alder, but it is quite evident that the excessive damage caused by late frosts at Avondale is, in a great measure, due to the presence of the grass surface, ground frosts being much more severe on grass than on bare ground.

At the outset the plants required were all tendered for as 2-year, 2-year transplants, or 1 to 2 feet in height, according to species.

**Origin of
Plants.**

In the case of the rarer varieties, great trouble was experienced in obtaining the quantities required, and many of those supplied were either too large or too small, or fell short of the number required, to enable the plots to be satisfactorily completed during the year they were commenced. The nurses supplied, especially larch, also varied a good deal in quality, and this probably accounts for much of the irregular growth exhibited by this species at the present date.

Spruce and Scots pine generally did well, and have developed at a more or less uniform rate. Ash nurses have varied a good deal in their rate of growth, partly on account of soil and situation.

With the majority of the more difficult transplanters, failures were replaced by plants either raised from seed, or seedlings bought in and grown on in the home nursery for a year or two. Many of the rarer varieties were obtained from Continental nurseries, but Irish nurseries supplied practically all the commoner species.

When the Avondale Estate was acquired, practically the whole of the demesne was under grass, carrying a number of scattered trees, except about two acres under tillage, and the steep banks adjoining the river. The latter were covered with birch, hazel, and oak scrub, and the remains of a timber crop of mixed conifers and broad-leaved trees. Before planting was commenced in 1906, the whole of the grass land was ploughed for the purpose of breaking up the turf, except in places where tree stumps or old fences rendered this impossible. One result of this ploughing was to bring forth a dense crop of thistles, which died out again in two or three years, but the

**Methods of
Planting.**

effect of the ploughing upon the early development of the trees was very marked. On spots which were not ploughed not only was the percentage of failures much greater, but the growth of the surviving trees during the first three or four years was much slower than on the ploughed portions.

Planting was done by digging pits, which extended into the soil beneath the furrows. The work was commenced in the autumn of 1905, and continued during the two following winters, when the bulk of the plots was completed so far as original planting was concerned. Filling up blanks, the replanting of plots which were at first more or less entire failures, and the planting of species which could not be obtained in the first year or two, proceeded until 1912-13, by which time all the more difficult transplanters, or more backward plots, may be regarded as having become established. These plots still require attention, but except where their backward condition is clearly due to late frost injury, as in the case of silver firs, etc., those not now established may be regarded as failures, or only capable of being established at too great a cost for ordinary forestry practice.

The surface of the ground on the ploughed portion gradually grassed over again, and in three years' time little difference could be noted between the surface of the plots, and the grass rides adjoining, beyond the rougher and coarser character of the herbage, and the difference in the growth of the trees already referred to.

The general planting distance was four feet, and the distance between plants of the main crop species eight feet. This provided 680 main crop trees and 2,042 nurses per acre, calculated to enable a full crop of the former to be present after the twentieth year in the case of species of average rate of growth. With larch nurses, this number usually provides a complete canopy at 8-10 years, and with spruce or Scots pine at 10-12 years.

Several of the rarer and more expensive species were planted at 12 feet apart or 302 trees per acre, the number of nurses being correspondingly increased.

While the majority of species were planted as 2-year, 2-year transplants or 1 to 2 feet in height, special methods had to be adopted with a few bad transplanters. Hickory, *Cupressus macrocarpa*, *Pinus insignis*, *Pinus laricio*, etc., were chiefly planted as 1-, 2- and 8-year seedlings or transplants, and extra care had to be taken in preparing the holes, and in keeping clean the plants for several years after planting. With the first three species, failures were numerous in spite of these precautions and it would appear necessary to raise these species in pots and plant out with balls of earth attached to the roots, if failures are to be generally avoided. With many other species more careful methods were employed than would be possible when planting on a large scale, but nothing in

the way of arboricultural treatment was given any of the trees, and their success or failure may be regarded as much the same as would take place under average planting conditions which would be inevitable if planting on economic lines were carried out.

The original idea with regard to the recording of planting expenses was that of keeping the cost of all operations on each plot separately. As the work proceeded, however, this

Cost of was found to be practically impossible, especially
Planting. with regard to labour, as the work of the Station had to be carried on as a whole, and not with

reference to individual plots alone. The method of calculating the cost has, therefore, been that of taking the average cost of labour in each operation, the purchase price of the plants, and the cost of replacing a fair proportion of failures. In all cases it may be assumed that the actual cost was slightly in excess of that stated, or of what would have been the case had larger areas been dealt with, while the price paid for the plants was considerably increased by the fact that they were purchased from public nurseries at a size fit to plant out, in place of being raised from seed or grown on from seedlings. To enable a fair comparison to be made between the relative cost of plants of different species, the price has been calculated on the scarcity or abundance of seed supply, ease or difficulty of transplanting in nursery, rate of growth during early stages, and behaviour of plants in transplanting. Many of the failures which occurred amongst bad transplanting species arose from the exposure to which the roots were necessarily subjected in course of transit, and this has to some extent been allowed for by giving the approximate percentage of failures which might have been expected rather than the actual number which occurred.

The average cost of each operation connected with the planting and filling up of the plots amounted as follows per acre :—

	s.
Ploughing	10
Digging holes	30
Planting	15
Replacing failures, cleaning, etc. ..	5
<hr/>	
Total cost of Labour	60

The average price of the plants, 2-year seedlings, 2-year transplants, or corresponding sizes, was 27s. 6d. per 1,000 for all the commoner species, and, allowing 3,000 to the acre, a total of £7 2s. 6d. per acre may be taken as the average cost of all species which might possibly be planted on commercial lines, ranging from £5 in the case of Scots pine, common spruce, etc., to £10 with species like *Abies grandis*, *Ulmus vegeta*, etc., which are not regarded

as ordinary forest trees, and which are difficult to obtain in large numbers.

Grouping the different species according to the approximate cost of planting, the following Table gives a fair indication of the possibility or otherwise of planting them on economic lines, assuming that £10 per acre is the extreme limit to which expenditure would be justified if a profit at the end of the rotation is expected. To obtain a profit with planting costs approaching £10 per acre, a large yield in timber and a high price per cubic foot must be obtained, and it is probable that only those species included in Groups I. and II. would be at all likely to show a profit when planted under average conditions :—

TABLE.—Approximate cost of planting per acre, including labour, trees, replacing failures during first three years, etc., using at least 680 plants exclusive of nurses.

I.	III.
£5	£7 10s. 0d.—£10
(pure)	(with nurses)
Ash (European)	<i>Abies grandis</i>
Beech	" <i>Nordmanniana</i>
Elm (English)	<i>Acer dasycarpum</i>
" (Wych)	" <i>macrophyllum</i>
Hornbeam	" <i>saccharinum</i>
Larch (European)	<i>Picea morinda</i>
Pine (Scots)	<i>Pinus insignis</i>
" (maritime)	" <i>rigida</i>
Poplar (Black Italian)	<i>Prunus serotina</i>
" (Abele)	<i>Quercus conferta</i>
Spruce (Norway)	" <i>rubra</i>
Sycamore	<i>Tsuga mertensiana</i>
	<i>Ulmus Americana</i>
	" <i>vegeta</i>
II.	IV.
£5—£7 10s. 0d.	£10 and UPWARDS
(with nurses of species in Group I.)	(with nurses)
Douglas Fir	<i>Abies cephalonica</i>
American Ash	" <i>nobilis</i>
Larch (Japanese)	" <i>lasiocarpa</i>
Maple (Norway)	<i>Carya</i> (various species)
Oak	<i>Cryptomeria japonica</i>
Pine (Weymouth)	<i>Cupressus macrocarpa</i>
" (Corsican)	<i>Juniperus virginiana</i>
" (Austrian)	<i>Larix occidentalis</i>
Turkey Oak	<i>Liriodendron tulipiferum</i>
Silver Fir	<i>Platanus orientalis</i>
Spruce (Sitka)	<i>Pterocarya caucasica</i>
<i>Thuja plicata</i>	<i>Sequoia gigantea</i>
	" <i>sempervirens</i>

The approximate costs of planting tabulated above are based upon experience gained at Avondale, and may not be applicable to other districts or conditions. The species named under Group IV.

were found particularly difficult to establish, either owing to damage by spring frost, failure after transplanting, or slow growth during the first two or three years, necessitating extra care and attention and a considerable amount of filling up before the plots could be considered established.

The particulars given below in tabulated form, and the accompanying notes, refer to the condition of the plots in the autumn of 1912. The heights given in the last column

Progress of are the average heights of the dominant trees,
Plots at end of most of which were planted in the first of the
1912. planting years given in the third column, the later
years being those in which filling up took place.

Plots marked with an asterisk have already formed a complete canopy :—

SECTION I.

Ground sloping gently towards the south.

Soil .. Light loam. Subsoil, schist
and gravel.

Main Crop .. Maples.

Nurses .. European Larch.

Plot No.	Area in Acres.	Planted in.	Main Crop.	Distance Apart.	Nurses.	Distance Apart.	Height in 1912.
				feet		feet	feet
1	2	1905	Sycamore ..	4	—	—	6-7
2	2	1905	Norway Maple ..	8	Larch ..	4	8
3	2	1907	<i>Acer dasycarpum</i> ..	8	Larch ..	4	5
4	2	1907	<i>A. saccharinum</i> ..	8	Larch ..	4	4½
4a	2	1907	<i>A. macrophyllum</i> ..	8	Larch ..	4	1-2

NOTES.—Sycamore fairly regular, but growing slowly until 1912. Norway Maple doing well, and keeping pace with Larch nurses. Both *Acer dasycarpum* and *Acer saccharinum* outgrown by Larch nurses; more or less branchy in habit, and ripen their wood badly in Autumn. *Acer macrophyllum* killed back near to ground almost every Winter. Larch nurses in Plots 3 and 4 doing well.

SECTION II.

Site, Soil, and Subsoil similar to Section I.

Main Crop Elms.

Nurses European Larch.

Plot No.	Area in Acres	Planted in.	Main Crop.	Distance Apart.	Nurses.	Distance Apart.	Height in 1912.
				feet		feet	feet
1	2	1905	"English" Elm ..	8	Larch ..	4	7
2	2	1905	Wych Elm ..	8	Larch ..	4	6
3	2	1906	"Chichester" Elm ..	8	Larch ..	4	5
4	2	1909	American Elm ..	8	Larch ..	4	5½

NOTES.—"English" and Wych Elm made little growth for the first three years, but now growing vigorously. "Chichester" Elm affected by a fungus

(*Dicliomera Saubinetii*) which killed bast and cambium in large patches on the stems, within a foot of the ground, and a number of plants succumbed. The survivors are now growing vigorously, and the blanks were filled up later. American Elm more or less branchy in the tops with slender stems. Larch nurses generally doing well. "English" Elm raised from Continental seed of *Ulmus campestris*. "Chiochester" Elm budded on Wych Elm stocks.

SECTION III.

Ground sloping towards the south.

Soil and Subsoil similar to Sections I. and II.

Main Crops .. (1) Beech.
 (2) Hornbeam.
 (3) Spanish Chestnut.
 Nurses .. (1) Spruce.
 (2) European Larch.

Plot No.	Area in Acres	Planted in.	Main Crop.	Distance Apart	Nurses.	Distance Apart.	Height in 1912.
				feet		feet	feet
1	1	1905	Beech, pure ..	3	—	—	7
2	1	1905	Beech ..	6	Spruce ..	3	7
3	1	1905	Beech ..	6	Larch ..	3	7-8
4	1	1905-11	Spanish Chestnut ..	4	—	—	5
5	1	1905-9	Hornbeam ..	3	—	—	3
6	1	1905-9	Hornbeam ..	6	Spruce ..	3	3½
7*	1	1905-9	Hornbeam ..	6	Larch ..	3	5
8	1	1905-11	Spanish Chestnut	8	Larch ..	4	3

NOTES.—Beech generally doing well and now growing vigorously. Hornbeam in Plots 5 and 6 made little growth for several years. The same species with Larch nurses in Plot 7 doing better, although almost suppressed by the Larch, which are exceptionally vigorous and uniform in this Plot, and from 8-10 feet high. Spanish Chestnut in Plots 4 and 8 doing badly, being cut back by late frost almost annually since planting, and considerable filling up has been done.

SECTION IV.

Ground sloping towards the south.

Plots 6, 7, 13 and 14 are situated in a hollow.

Soil .. Loam, heavier and wetter than the preceding Sections. Subsoil, schisty gravel with clay.
 Main Crop .. Oaks.
 Nurses .. (1) Ash.
 (2) Beech.
 (3) Spruce.
 (4) Hornbeam.
 (5) European Larch.

Plot No.	Area in Acres.	Planted in.	Main Crop.	Distance Apart.	Nurses.	Distance Apart.	Height in 1912.
				feet		feet	feet
1	1	1905	<i>Quercus sessiliflora</i>	3½	Ash ..	3½	5½
2	1	1905	" "	3½	Beech ..	3½	5½
3	1	1905	" "	3½	Spruce ..	3½	5
4	1	1905	" "	3½	—	—	5
5	1	1905	" "	3½	Larch ..	3½	6-7
6	1	1905	" "	3½	Hornbeam ..	3½	5½
7	½	1906	<i>Quercus pannonica</i>	7	Larch ..	3½	6
	½	1905	" <i>tinctoria</i> ..	7	" ..	3½	2
	½	1912	" <i>coccinea</i> ..	7	" ..	3½	3
8	1	1905	<i>Quercus pedunculata</i>	3½	Ash ..	3½	4½
9	1	1905	" "	3½	Beech ..	3½	4½
10	1	1905	" "	3½	Spruce ..	3½	4½
11	1	1905	" "	3½	—	—	4-5
12	1	1905	" "	3½	Larch ..	3½	6
13	1	1905	" "	3½	Hornbeam ..	3½	5
14	½	1905-11	<i>Quercus rubra</i> ..	7	Larch ..	3½	2-3
	½	1905-11	" <i>palustris</i> ..	7	" ..	3½	2-3
	½	1905-11	" <i>ceris</i> ..	7	" ..	3½	2-3

NOTES.—*Quercus sessiliflora* mixed with *Quercus pedunculata* at original planting, but the latter will be gradually removed in thinnings. Both varieties are doing well, but have not yet formed definite leaders, and will require pruning during the next 2-3 years. Of the other species, *Quercus rubra* has suffered most from Spring frosts, and on 15th June, 1911, both young and old growths of these plants were killed back for a considerable distance. Larch in Plot 7 doing exceptionally well, and Hornbeam in Plot 6 making good growth.

Surface of ground in this Section covered more or less generally by *Aira caespitosa*.

SECTION V.

Ground sloping gently towards the north.

Soil .. Loam. Subsoil, schisty gravel with clay.
 Main Crop .. *Abies* (different species).
 Nurses .. Common Silver Fir.

Plot No.	Area in Acres.	Planted in.	Main Crop.	Distance Apart.	Nurses.	Distance Apart.	Height in 1912.
				feet		feet	feet
1	1	1905-9	<i>Abies nobilis</i> ..	8	<i>Abies pectinata</i>	4	2-3
2	1	1905	" <i>grandis</i> ..	8	" "	4	8
3	1	1905	" Nordman- niana	8	" "	4	3-4
4	½	1909-12	" <i>concolor</i> ..	8	" "	4	1½
4a	½	1905	" <i>pectinata</i> ..	4	—	—	1½
5	1	1905	" "	4	—	—	1½
6	1	1905-8	" <i>lasiocarpa</i> ..	8	<i>Abies pectinata</i>	4	3-4
7	1	1905-8	" <i>cephalonica</i> ..	8	" "	4	3-4

NOTES.—With the exception of *Abies grandis*, all the above species have suffered severely from late frosts. The Common Silver Fir has been most severely checked, and many plants are no higher than when originally planted. Plot 1 (*Abies nobilis*) was thickened in 1910 by an additional 700 plants. Next to *Abies grandis*, *Abies cephalonica* probably doing best.

SECTION VI.

Ground sloping towards the north.

Soil .. Light loam. Subsoil, schist and gravel.
 Main Crop .. *Picea* (various species).
 Nurses .. (1) Japanese Larch.
 (2) Norway Spruce.
 (3) Red Spruce (*Picea rubra*).

Plot No.	Area in Acres.	Planted in.	Main Crop.	Distance Apart.	Nurses.	Distance Apart.	Height in 1912.
				feet		feet	feet
1*	1	1905	Sitka Spruce ..	4	Jap. Larch ..	4	8-10
2*	1	1905	" " ..	4	" " ..	4	8-10
3	1	1905	Norway Spruce ..	4	—	—	6
4	1	1905	" " ..	4	—	—	6
5	1	1905-12	<i>Picea morinda</i> ..	8	Norway Spruce ..	4	1
5a	1	1905-13	" <i>ajanensis</i> ..	8	<i>Picea rubra</i> ..	4	1-2
6	1	1905-13	" <i>omorica</i> ..	8	" " ..	4	1-2
6a	1	1905-10	" <i>alba</i> ..	7	Norway Spruce ..	3½	3-4
7	1	1905-9	" <i>pungens</i> ..	7	" " ..	3½	2½-3
7a	1	1905-9	" <i>nigra</i> ..	7	" " ..	3½	2½-3

NOTES.—Sitka Spruce growing vigorously, but many plants attacked by *Aphis piceae* or *abietis*, and losing their needles in Spring. All other species doing well, but *Picea Morinda* not planted until 1911-12. Main crop species in Plots 5a and 6 planted with *Picea omorica* and *Picea ajanensis* in 1913. Probably no species in Plots 5 and 7 will reach timber size, but *Picea rubra* doing well at present. *Picea morinda* raised from seed supplied by Indian Forest Department.

SECTION VII.

Ground level on top of a ridge.

Soil .. Light loam. Subsoil, schist and gravel.
 Main Crop .. *Pinus* (various species).
 Nurses .. (1) European Larch.
 (2) Japanese Larch.
 (3) Spruce.
 (4) Scots Pine.

Plot No.	Area in Acres.	Planted in.	Main Crop.	Distance Apart.	Nurses.	Distance Apart.	Height in 1912.
				feet		feet	feet
1	1	1905-10	Corsican Pine ..	4	—	—	5-6
2	1	1905-10	" " ..	4	Larch ..	4	6-7
3	1	1905-10	" " ..	4	Spruce ..	4	6-7
4	1	1905-9	Maritime Pine ..	4	Larch ..	4	3-5
5	1	1906	Banks' " ..	4	Jap. Larch ..	4	6-7½
5a	1	—	—	—	—	—	—
6	1	1905-10	Austrian Pine ..	4	—	—	5-7
7*	1½	1905	Scots " ..	3½	—	—	8
8	1	1906-11	Weymouth " ..	4	—	—	3-4
9	1	1906-11	" " ..	4	Larch ..	4	3-4
10	1	1906-11	" " ..	4	Scots Pine ..	4	3-4
11	1	1906-11	<i>Pinus insignis</i> ..	4	Larch ..	4	6-9
12	1	1906-11	" " ..	4	" ..	4	6-9
13	1	1906-8	" <i>rigensis</i> ..	4	" ..	4	4-5
14	1	1906-8	" <i>rigida</i> ..	4	" ..	4	4-5

NOTES.—Scots Pine (Plot 7) making most satisfactory and regular growth, and complete canopy formed. Weymouth Pine (Plot 8) more or less affected by wind during the Winter and badly damaged in Summers of 1911 and 1912 by slugs, which ate patches of bark from the stems and destroyed several hundreds of plants.

All other species doing well, but *Pinus insignis*, maritime and Corsican pines very irregular in size owing to transplanting failures. Best transplanting results with these three species have been obtained by planting 3-year old plants which had been transplanted in the nursery the previous year, and planting out in the Plots in late Spring.

A few *Pinus insignis* have been killed by Winter frost when under 12 inches in height, and this species is difficult to establish unless raised in pots and planted out with balls of earth.

SECTION VIII.

Ground sloping towards the south.

Soil .. Rough, stony, light loam. Subsoil, schist gravel and quartz rock.

Main Crop .. Larch (various species).

Nurses .. (1) Beech.
(2) Spruce.

Plot No.	Area in Acres.	Planted in.	Main Crop.	Distance Apart.	Nurses.	Distance Apart.	Height in 1912.
1	$\frac{1}{2}$	1911	<i>Larix occidentalis</i> ..	feet 12	Beech and C. Larch	feet 4	feet 2 $\frac{1}{2}$ -3
1a	$\frac{1}{2}$	1911	" " ..	12	Spruce and C. Larch	4	2 $\frac{1}{2}$ -3
1b	$\frac{1}{2}$	1911	" " ..	4	—	—	2 $\frac{1}{2}$ -3
2*	1 $\frac{1}{2}$	1906	Jap. Larch ..	4	Spruce and Beech	4	8-9
2a*	$\frac{1}{2}$	1906	" " ..	4	—	—	8-9
3	1 $\frac{1}{2}$	1906-9	Tyrolese Larch ..	4	Spruce and Beech	4	4-5
3a	$\frac{1}{2}$	1906-9	" " ..	4	—	—	4-5
4	2	1906-9	Scotch " ..	4	Spruce and Beech	4	4-5
4a	$\frac{1}{2}$	1906-9	" " ..	4	—	—	4-5
5	1	1906-9	Irish " ..	4	Beech ..	4	6-7
5a	1	1906	Silesian " ..	4	Beech ..	4	4-5
6	2 $\frac{1}{2}$	1906	Irish " ..	6	—	—	8-10
7*	3	1906	Jap. " ..	6	—	—	10-12

NOTES.—Japanese Larch growing vigorously, but stems slightly crooked and inclined to branch in crowns. Tyrolese Larch doing badly so far, and much filling up required, while traces of Larch disease have appeared. Plots of Scotch, Silesian, and Irish origin doing better. Eastern ends of Plots 3, 4, and 5 were destroyed by fire in Spring, 1910, and were re-planted in 1911-12, except 5a, owing to inability to obtain Silesian Larch.

Plot 1a, originally planted with *Larix sibirica*, but all plants died in two years. This Plot has now been filled up with *Larix occidentalis*, obtained from 1 lb. of seed supplied through Professor Henry in 1910.

SECTION IX.

Ground sloping towards the south.

Soil .. Thin light loam. Subsoil, rocky schist.

Main Crop .. Cedars.

Nurse .. European Larch.

Plot No.	Area in Acres.	Planted in.	Main Crop.	Distance Apart.	Nurses.	Distance Apart.	Height in 1912.
1	1½	1912	<i>Cedrus atlantica</i> ..	feet 12	Larch ..	feet 4	feet 1
2	1	1906-7	„ <i>deodara</i> ..	12	„ ..	6	3-4

NOTES.—Atlantic and Lebanon Cedars originally planted in Section XVIII., but both species failed on account of late frost damage and poor soil, Deodars in Section IX., planted amongst Hazel scrub, doing fairly well. Atlantic Cedars too recently planted to be considered established. Lebanon Cedars not re-planted, as they prove comparative failures in this part of Ireland.

SECTION X.

Ground sloping towards the south and east.

Soil .. Light loam. Subsoil, schisty gravel.
 Main Crop .. Ash.
 Nurses .. (1) Spruce.
 (2) European and Japanese Larch.
 (3) Oak.

Plot No.	Area in Acres.	Planted in.	Main Crop.	Distance Apart.	Nurses.	Distance Apart	Height in 1912.
				feet		feet	feet
1	½	1906	Ash (European) ..	4	Spruce ..	4	4-5
2	1	1906	„ „ ..	4	Larch ..	4	4-5
3	1	1906	„ „ ..	4	Oak ..	4	4-5
4	1	1906	„ „ ..	4	—	—	4-5
5	1	1906	Ash (White American)	4	Larch ..	4	3-4
6	1	1906	Ash (White American)	4	Oak ..	4	3-4
7	½	1909	Ash (<i>Fraxinus pubescens</i>)	4	—	—	2-3
8	½	1909	Ash (<i>Fraxinus pubescens</i>)	8	Japanese Larch	4	2-3
9	½	1910	Ash (<i>Fraxinus oregana</i>)	8	—	4	2-3

NOTES.—Ground occupied by Plots 1-6 not ploughed, and growth probably slower in consequence. Two patches in Plot 4 planted on site formerly occupied by Oaks, and Ash on these 10-12 ft. in height. American Ash growing slower than European. *Fraxinus pubescens* making little growth as yet. Plots 7, 8, and 9 planted on ground previously covered with scrub.

SECTION XI.

Ground sloping gently towards the south and east
 in valley.

Soil .. Light loam. Subsoil, schist and gravel.
 Main Crop .. Spanish Chestnut.
 Nurses .. European Larch.

Plot No.	Area in Acres.	Planted in.	Main Crop.	Distance Apart.	Nurses.	Distance Apart.	Height in 1912.
1	7	1906-10	Spanish Chestnut	feet 5	Larch ..	feet 5	feet 4-5

NOTES.—Spanish Chestnut intended for coppice treatment under shelter of a thin crop of Larch. The Chestnuts here suffered badly from Spring frosts, and the filling up of further blanks has been deferred until the Larch are able to provide shelter. The Larch have done remarkably well, and are now from 6-10 ft. in height.

SECTION XII.

Ground level, in valley beside river.

Soil .. Mainly alluvial sand and sandy loam. Subsoil, sand and river gravel.

Main Crop .. *Robinia pseudacacia*.

Nurses .. European Larch.

Plot No.	Area in Acres	Planted in.	Main Crop.	Distance Apart.	Nurses.	Distance Apart.	Height in 1912.
1	3	1906-10	<i>Robinia</i> ..	feet 4	Larch ..	feet 4	feet 3-4

NOTES.—The *Robinia* seldom ripens its wood in Autumn, and the shoots die back more or less annually, while Spring frosts also damage this species, which is not adapted to the Irish climate. The Larch nurses are growing fairly well, but show signs of canker.

This Plot will gradually be filled up with *Caragana frutescens* and *Gleditsia triacanthos*, with the idea of forming a mixture of leguminous species.

SECTION XIII.

Flat alluvial deposit close to river.

Soil .. Light loam, in places peaty. Subsoil, schisty gravel with clay.

Main Crop .. Douglas Fir.

Nurses .. (1) European Larch.
(2) Norway Spruce.

Plot No.	Area in Acres.	Planted in.	Main Crop.	Distance Apart.	Nurses.	Distance Apart.	Height in 1912.
1*	a. r. p. 3 2 20	1906-9	Oregon Douglas Fir	feet 7	Larch ..	feet 3½	feet 12-14
2	3 2 20	1906-9	Colorado Douglas Fir	7	Spruce ..	3½	4-6

NOTES.—A remarkable difference exists between the development of Plots 1 and 2. Both Douglas Fir and Larch in the former are growing rapidly, with the

exception of two patches in frost holes, in which Poplars have recently been planted to provide shelter. The Colorado Douglas Fir in Plot 2 is still smaller than the Spruce nurses, but now beginning to grow more freely. Little difference can be noted between the two varieties as regards sensitiveness to late frosts, but Oregon variety more easily injured by early frost.

SECTION XIV.

Ground sloping steeply towards the east in Plot 1, and towards the south in Plot 2.

Soil .. Thin, light loam. Subsoil, schisty rock and gravel.

Main Crop .. Hemlock Spruce.

Nurses .. European Larch.

Plot No.	Area in Acres	Planted in.	Main Crop.	Distance Apart.	Nurses.	Distance Apart.	Height in 1912.
1	2½	1906	<i>Tsuga Mertensiana</i>	feet 12	Larch ..	feet 6	feet 6-8
2	½	1906	<i>Tsuga canadensis</i> ..	12	Larch ..	6	3-4

NOTES.—Plot 1 originally scrub, amongst which *Tsuga* was planted. *Tsuga* and Larch both doing well.

Tsuga canadensis in Plot 2 planted in grass, and trees have made little progress, being badly damaged by late frosts.

SECTION XV.

Ground sloping gently towards the east.

Soil .. Loam. Subsoil, clayey and hard.

Main Crops .. (1) *Cupressus Lawsoniana*.

(2) *Cupressus macrocarpa*.

(3) *Juniperus virginiana*.

Nurses .. (1) European Larch.

(2) Japanese Larch.

Plot No.	Area in Acres	Planted in.	Main Crop.	Distance Apart.	Nurses.	Distance Apart.	Height in 1912.
1*	1	1906-7	<i>Cupressus Lawsoniana</i>	feet 4	Larch ..	feet 4	feet 7-8
2	1	1906-11	<i>Cupressus Macrocarpa</i>	6	Jap. Larch ..	6	5-7
3	1	1906-9	<i>Juniperus Virginiana</i>	6	Larch ..	6	3-4

NOTES.—Original planting of *Cupressus Lawsoniana* failed for various reasons; second planting did well. Plot 2 filled up frequently owing to large number of failures, and death of small plants after hard frosts, and the crop is more or less irregular. *Juniperus virginiana* fairly uniform.

SECTION XVI.

Ground steep, sloping towards the east.

Soil .. Light loam. Subsoil, schisty rock and gravel.

Main Crops .. (1) *Thuja plicata*.
 (2) *Sequoia gigantea*.
 (3) *Sequoia sempervirens*.
 (4) *Cryptomeria japonica*.

Nurses .. European Larch.

Plot No.	Area in Acres.	Planted in.	Main Crop.	Distance Apart.	Nurses.	Distance Apart.	Height in 1912.
				feet		feet	feet
1	1	1906	<i>Thuja plicata</i> ..	8	Larch ..	4	5-8
1a	$\frac{1}{2}$	1912	" ..	4	—	—	1-2
2	1	1906	<i>Sequoia gigantea</i> ..	12	Larch ..	4	5-7
3	1	1906	<i>Sequoia sempervirens</i>	12	" ..	4	4-5
4	1	1906-10	<i>Cryptomeria Japonica</i>	12	" ..	4	3-5

NOTES.—*Thuja* and *Sequoia gigantea* making normal growth, although ground rather dry for former. *Sequoia sempervirens* slightly affected by Spring frosts and *Cryptomeria* considerably damaged by frost in October, 1912. Otherwise all four species doing well. Larch nurses affected with Larch canker.

SECTION XVII.

Ground occupying a cirque close to the river, with an eastern exposure and subject to Spring frost at lower side.

Soil .. Rubbly light loam. Subsoil, rocky, schisty gravel.

Main Crops .. (1) *Platanus*.
 (2) *Juglans*.
 (3) Hickory.
 (4) Tulip Tree.
 (5) *Pterocarya*.
 (6) *Zelkova*.

Nurses .. (1) Ash.
 (2) European Larch.

Plot No.	Area in Acres.	Planted in.	Main Crop.	Distance Apart.	Nurses.	Distance Apart.	Height in 1912.
				feet		feet	feet
1	$\frac{1}{2}$	1906	<i>Platanus orientalis</i>	8	Ash ..	4	4-5
2	$\frac{1}{2}$	1906	<i>Juglans nigra</i> ..	8	" ..	4	3-4
3	$\frac{1}{2}$	1906	<i>Carya porcina</i> ..	8	" ..	4	1 $\frac{1}{2}$
3a	$\frac{1}{2}$	1906-8	<i>Carya amara</i> ..	8	" ..	4	1 $\frac{1}{2}$
4	$\frac{1}{2}$	1906	<i>Liriodendron tulipifera</i>	8	" ..	4	
5	$\frac{1}{2}$	1906	<i>Juglans regia</i> ..	8	" ..	4	2-3
6	$\frac{1}{2}$	1906	<i>Carya alba</i> ..	8	" ..	4	1
7	$\frac{1}{2}$	1908	<i>Pterocarya caucasica</i>	8	" ..	4	2-3
8	1 $\frac{1}{4}$	1906	<i>Zelkova Keaki</i> ..	12	Larch ..	4	5-7

AVONDALE FORESTRY STATION.

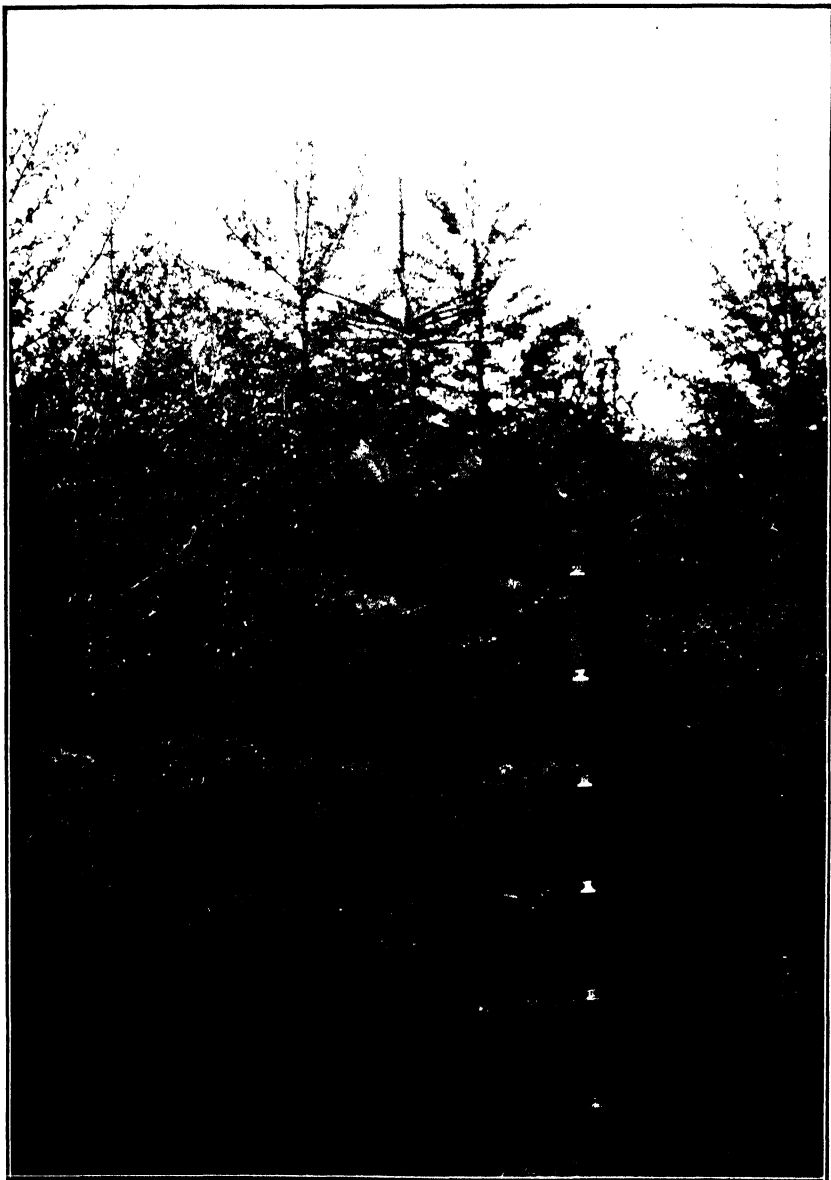
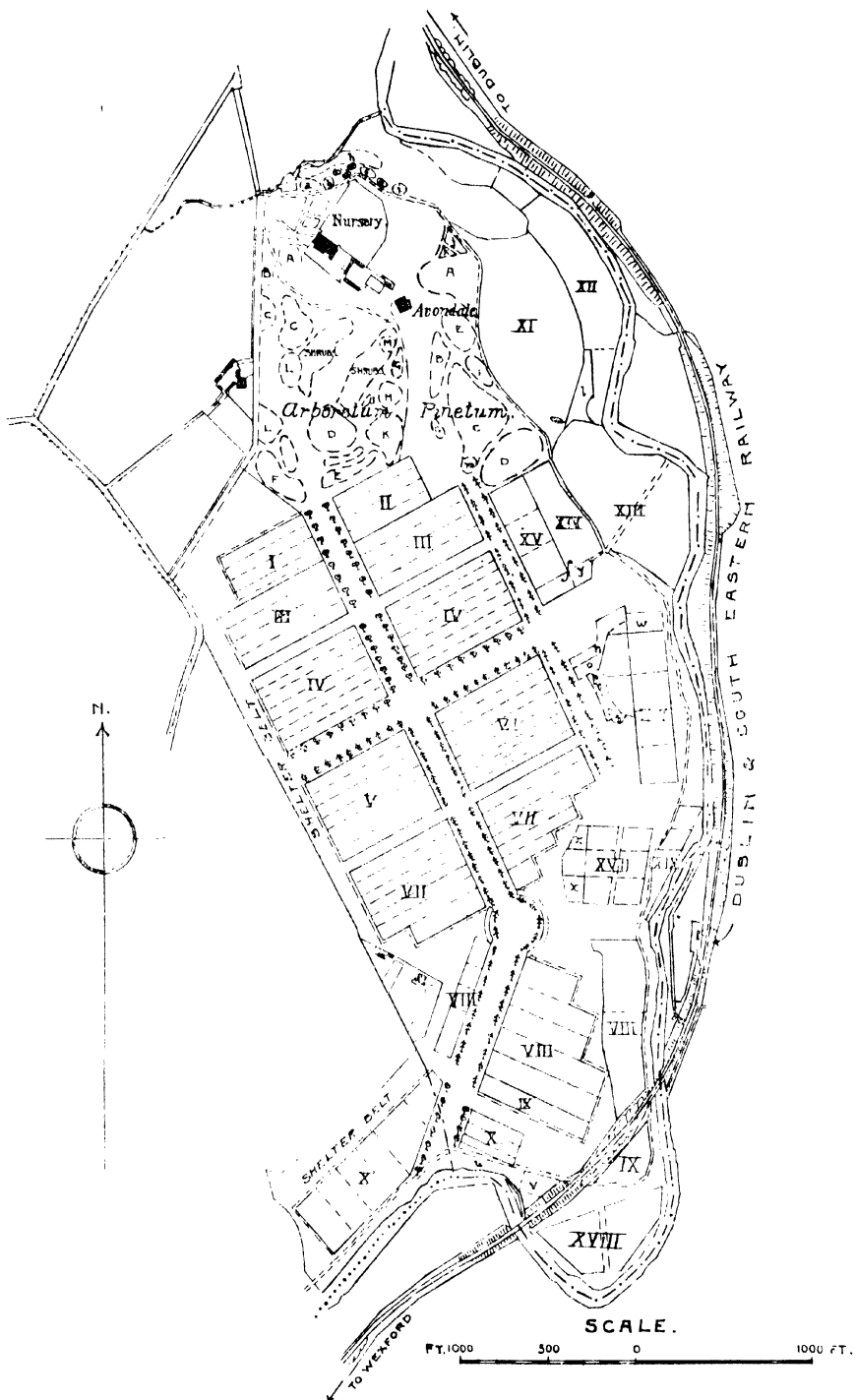


Fig. 5.—Plot 1, Section VI. Sitka Spruce and Japanese Larch.

— AVONDALE FORESTRY STATION —



PLAN OF DEMONSTRATION PLOTS.

NOTES.—Growth of all these species slow at present. *Platanus*, *Juglans nigra*, and *regia* and *Zelkova* alone making any growth in height. *Carya alba* cut down annually, but *Carya porcina* and *amara* beginning to form leading shoots. *Liriodendron* practically died out, and will be replaced later. *Pterocarya* seldom ripens its wood in Autumn. Ash nurses badly checked by frost, but now starting away.

SECTION XVIII.

Flat alluvial deposit close to river.

Soil .. Alluvial sand. Subsoil, river gravel.
Main Crop .. *Prunus*.
Nurses .. European Larch.

Plot No.	Area in Acres.	Planted in.	Main Crop.	Distance Apart.	Nurses.	Distance Apart.	Height in 1912.
1	1½	1906	<i>Prunus serotina</i> ..	feet 8	Larch ..	feet 4	feet 4-5
2	1½	1906	„ <i>cerasus</i> ..	8	„ ..	4	3-4

NOTES.—Soil too dry and poor to produce good crops, although Plot 1 rather better than 2. *Prunus serotina* healthy, but inclined to branch. *Prunus cerasus* badly damaged by Black Aphis. Larch nurses more or less variable, and blanks in Plot 2 filled up with *Pinus Banksiana* in 1912-13.

SECTION XIX.

Strip of land adjoining river bank, immediately below
Section XVII.

Soil .. Fresh loam, with rocky subsoil.
Main Crop .. Poplars, planted pure.

Plot No.	Area in Acres.	Planted in.	Main Crop.	Distance Apart.	Nurses.	Distance Apart.	Height in 1912.
1*	½	1907	<i>Populus alba</i> (variety <i>Argentea</i>)	feet 6	—	feet —	feet 10-15
2	½	1909	<i>Populus serotina</i>	6	—	—	6-8
3	½	1909	<i>Populus serotina</i> <i>nova</i>	6	—	—	5-6

NOTES.—*Populus alba* growing rapidly. The ground apparently too dry for the other species to make their normal growth. As they become fully established, probably the rate of growth will increase.

In addition to the species already named small pure groups of the following have been planted in odd corners and in situations

likely to suit them. These groups are indicated on the plan by letters :—

- (a) *Fraxinus oregona*.
- (b) *Quercus coccinea*.
- (c) *Prunus serotina*.
- (d) *Liriodendron tulipifera*.
- (e) *Alnus cordata*.
- (f) *Fraxinus viridis*.
- (g) *Carpinus americana*.
- (h) *Fraxinus pubescens*.
- (i) *Tsuga canadensis*.
- (j) *Cedrus Deodara*.
- (k) *Cedrus Libani*.
- (l) *Alnus glutinosa* and *incana*.
- (m) *Pinus cembra*.
- (n) *Cupressus macrocarpa*.
- (o) *Pinus sylvestris* (from Irish seed).
- (p) *Pinus montana*.
- (q) *Pinus banksiana*.
- (r) *Pinus sylvestris* (from Scotch seed).
- (s) Do. (from French seed).
- (t) Do. (from Scotch seed).
- (u) Willows (various species).
- (v) *Populus tremula*.
- (w) *Pseudo-tsuga Douglasii* (Frazer River seed).
- Do. (Irish seed).
- { *Abies brachyphylla*.
- { *Abies pinsapo*.
- { *Abies arizonica*.
- { *Abies sibirica*.
- (x) { *Abies grandis*.
- { *Abies pindrow*.
- { *Abies Nordmanniana*.
- { *Abies balsamea*.

A few other species growing on in the nursery have still to be planted out, the most important of which is *Pinus peuke* from seed obtained in Bulgaria by The O'Mahony of Kerry. A number of unnamed species of *Abies*, *Picea*, etc., the seeds of which were collected in China by Wilson, Clinton Baker, etc., and sent to Avondale by Professor Henry, are being raised and will ultimately be planted in the pinetum.

In the Spring of 1913 a large number of hybrid elms, raised by Professor Henry at Cambridge, were planted in a field at the main entrance to Avondale. These will be kept under observation and described when sufficiently developed.

GENERAL SUMMARY.

RELATIVE SUCCESS OF TIMBER-PRODUCING SPECIES DURING THE FIRST FIVE YEARS, NAMED IN ORDER OF RATE OF GROWTH.

I. Growing rapidly, and not seriously injured by either Winter or Spring frost.

CONIFERS.

- *1. *Pseudo-tsuga Douglasii* (Oregon Variety).
- *2. *Picea sitchensis*.
- 3. *Larix leptolepis*.
- *4. " *Europea*.
- 5. *Cupressus macrocarpa*.
- 6. *Pinus insignis*.
- 7. " *laricio*.
- 8. " *sylvestris*.
- 9. *Abies grandis*.
- 10. *Tsuga mertensiana*.
- *11. *Picea excelsa*.
- 12. *Pinus banksiana*.
- 13. " *maritima*.
- 14. *Abies cephalonica*.
- 15. *Thuja plicata*.
- 16. *Cupressus Lawsoniana*.
- 17. *Cryptomeria japonica*.
- 18. *Sequoia gigantea*.

BROAD-LEAVED SPECIES.

- 1. *Populus canadensis*.
- 2. " *alba*.
- 3. *Alnus glutinosa*.
- 4. " *incana*.
- 5. *Ulmus vegeta*.
- 6. " *montana*.
- 7. " *campestris*.
- 8. *Betula alba*.
- 9. *Acer platanoides*.
- 10. " *pseudo-platanus*.
- *11. *Fraxinus excelsior*.

II. Making a moderate growth, and not permanently injured by frosts.

CONIFERS.

- 1. *Pinus strobus*.
- 2. " *rigida*.
- 3. " *austriaca*.
- 4. *Picea alba*.
- *5. *Pseudo-tsuga Douglasii* (Colorado variety).
- *6. *Sequoia sempervirens*.
- 7. *Cedrus deodara*.
- 8. " *atlantica*.
- 9. *Juniperus virginiana*.

BROAD-LEAVED SPECIES.

- *1. *Castanea vesca*.
- 2. *Carpinus betulus*.
- *3. *Quercus robur*.
- 4. " *cerris*.
- 6. *Fraxinus Americana*.
- *7. *Juglans nigra*.
- *8. " *regia*.
- 9. *Zelkova kcaiki*.
- 10. *Platanus orientalis*.
- 11. *Prunus serotina*.
- 12. *Tilia* (various species).

III. Making moderate growth during Summer, but ends of shoots usually killed back in Winter.

- 1. *Acer saccharinum*.
- 2. " *dasyarpum*.
- 3. " *macrophyllum*.
- 4. *Robinia pseud-acacia*.
- 5. *Liriodendron tulipiferum*.

IV. Making poor growth, and not likely to attain timber size.

CONIFERS.

- 1. *Larix sibirica*.
- 2. *Pinus peuke*.
- 3. *Cedrus libani*.
- 4. *Picea morinda*.

BROAD-LEAVED SPECIES.

- 1. *Carya alba*.
- 2. " *porcina*.
- 3. " *amara*.
- 4. *Pterocarya caucasica*.
- 5. *Catalpa speciosa*.

* Injured by Spring frosts in low situations, chiefly when under 5 feet in height.

THE LIMING OF LAND.

Liming used to be one of the chief means of improving land for agricultural purposes; but of late years this practice has greatly decreased, for which three reasons may be assigned. In the first place, experience shows that a second application of lime is rarely followed by such strikingly good results as were produced by the first. Accordingly, a farmer who limes land a second or a third time is somewhat disappointed when he compares the effects with those which followed the first application. It is not remarkable, therefore, that the farmers of the present day do not place such strong faith in the advantages of lime as did their predecessors who first tried it. Secondly, the last half century has seen the discovery and constantly increasing use of so-called artificial manures. Compared with lime these yield quicker and more certain returns, and farmers have, therefore, looked to them rather than to lime as a means of improving the fertility of the soil. Finally, liming is an operation requiring much labour, and this becomes every year scarcer and dearer.

In spite of these facts, however, an application of lime to land is, under certain conditions, still profitable, though its effects may not

**Liming, under
certain condi-
tions, still
profitable.**

be so quick or so apparent as those from artificial manures, and even though the operation may be more costly than formerly. Fortunately, good limestone is plentiful in Ireland, and there are many limekilns standing idle. Even where there are none, a kiln is neither expensive to build nor costly to work, where farmers co-operate. If the initial cost of liming be high it must be remembered that the effect often extends over many years, and although the results are not so pronounced as when the land was first reclaimed, they are none the less real.

That renewed interest is being taken in liming is shown by its forming the subject of numerous letters received by the Department from farmers. These communications can generally be resolved into one or more of the following questions:—What soils require lime? What are the indications of the need of lime? Will chemical analysis of the soil disclose whether liming would be profitable? When, in what form, in what quantity, and in what manner should lime be applied?

Before proceeding to answer these questions, it is necessary that some explanation of the properties of lime and of its action in the soil should be given.

In Ireland three supplies of lime are available, viz., shell sand, only to be obtained from certain parts of the seaboard ; marl, which occurs in some localities ; and ordinary limestone.

Supplies of Lime available in Ireland. Shell sand and marl are both excellent for almost all soils and crops, but they have only a local interest. Their value is greatly enhanced when they contain an appreciable percentage of a phosphate. Ordinary limestone is, on the other hand, widely distributed and therefore forms the chief source of lime ; and it is with it, and not with shell sand or marl, that the farmer is chiefly concerned.

Limestone, as everyone knows, is usually burnt before being used for agricultural purposes. It is then known as lime or quicklime, and must be reduced to powder before it can be mixed with the soil.

Preparation of Quicklime. Sometimes quicklime is ground to a powder, put up in bags in a similar fashion to basic slag, and sold to farmers under the name of ground-lime. In this form it is applied to the soil by means of a manure distributor. It is not necessary, however, for farmers to erect grinding plants, as burnt lime can be reduced to powder in the old-fashioned way by exposure to the air. This process may be hastened by application of water ; but if this method be adopted the lime should be slaked on the field and spread immediately it has fallen to a powder. It is a very bad practice, and a direct loss to the farmer, to use so much water when slaking as will cause any portion of the lime to form a paste. The same bad result may be brought about by over exposure to rain. The more evenly the lime can be distributed the greater and quicker is its action on the soil. Two tons per statute acre, thoroughly distributed, may have as great an effect as twice that quantity carelessly applied. It may be asked why some farmers go to the expense of buying ground lime and of applying it with a manure distributor. They do so because more even distribution is secured, and therefore a less quantity will cover the land than if slaked lime is spread with a spade in the ordinary way. By taking pains, when slaking, to secure a good powder, and when spreading to see that every inch of land gets its due proportion, the farmer can realise almost all the advantages of ground lime.

Within recent years experiments have been carried out in Ireland and elsewhere to ascertain the effects of applying ground limestone, that is, finely ground, but unburnt, limestone rock, to land. The advantage of using lime in this form is that the expense of burning is saved.

Ground Limestone. Whilst the results of the experiments, up to the present, have not been entirely uniform, they indicate that in

some instances applications of ground limestone gave very fair returns in comparison with those obtained from dressings of slaked lime and ground burnt lime. Especially was this the case on peaty and clay soils and on mountain pastures. It will be necessary, however, to carry out further trials before definite recommendations can be made regarding the use of ground limestone.

The action of lime in the soil now falls to be considered. It is manifold. The farmer notices that a field which has been limed is more easily tilled. He notices, further, that stiff **Influence of Lime** soils, after they have been limed, allow surface **on the Mechanical** water to pass more quickly through them. This **State of the Soil.** is one, but not the chief, reason why farmers used to lime reclaimed land after draining. Technically, this action of lime is spoken of as its property of coagulating certain substances in the soil, rendering them less impervious to water and more easily ploughed, harrowed, and cultivated. The need for air in the soil is not often realised, but air is as necessary for the roots of plants as for animals. When water passes into soil it fills the spaces which, except in a water-logged soil, are filled with air. As the water drains away from the soil a supply of fresh air takes its place. Lime on stiff soils, therefore, facilitates drainage and the circulation of fresh air in the soil.

A second, and perhaps the most important, action of lime is its power of hastening the decay of vegetable and animal matter. This property must not, however, be confused with the caustic or "burning" action of freshly-burned lime. Lime, when spread on the soil, very speedily loses its caustic properties, and becomes what is known as mild lime. It is no longer quick, but "dead"; and its presence in the soil in this form creates conditions very favourable to decay. The vegetable matter—roots, stems, and leaves of plants—in the soil, whether left there from a previous crop or applied in the form of farmyard manure, contains valuable fertilising material which is useless until decay has been effected. The most important property of lime lies in its power of hastening this process of resolving vegetable matter into the compounds from which it was originally formed, and thus rendering them once again available for the building up of a new crop.

It is thus easy to understand a statement which, although often challenged, is nevertheless correct, viz., that lime is in itself not a direct fertiliser. True it is that all plants take lime from the soil; but there are few if any fields in Ireland whose soil does not contain infinitely more lime than is actually removed by generations of healthy crops.

Everyone must be familiar with the action of lime on certain pastures. The grass becomes greener, and the herbage is more eagerly eaten by stock. An application of nitrate of soda to grass land produces similar effects. So, also, does a top-dressing of a farmer's compost formed of the usual materials—lime, soil, vegetable and animal matter—which have lain in contact for some time. In each case the greenness of the grass is due to the same cause, viz., the stimulating effect of a nitrate. The action of lime in the soil is in this respect identical with the part it plays in the compost. In a compost heap one notices the rapid diminution in bulk after the admixture of lime. Accompanying the change in volume is the formation of a nitrate. Indeed, nitrates are manufactured in India in this very manner. The presence of a nitrate in the compost is first demonstrated to the farmer when he sees the result of its application to grass land. It is not, then, the lime of the compost which stimulates the grass, neither does lime itself increase the stock of fertilising ingredients in a soil.

But notice that the stock of vegetable matter in the compost diminished rapidly. In like manner does lime reduce the stock of vegetable matter in the soil, and in proportion as this is so the land is impoverished; for nitrogen, the most important, and by far the most costly, ingredient of fertilisers, was contained in the vegetable matter from which by a complicated process favoured by lime it was quickly rendered available.

Nitrogen, however, is only one of the substances whose presence in, or absence from, the soil determines the crop yield. Plants require, for example, a supply of phosphates and potash.

Action of Lime on some Minerals of the Soil. These two important and costly substances exist in vegetable matter, and also in the earthy or mineral part of the soil. Like nitrogen, they

may be present in considerable quantity without exerting any appreciable influence on the yield of the crop. The natural action of air, water, frost, and other agents at work on the soil reduce them to forms which stimulate plant growth; but the farmer also has it in his power to materially accelerate the process by an application of lime. It must be observed, however, that lime causes what may be termed an unnatural drain on the available stock of phosphates and potash in the soil, just as in the manner described above it diminishes the stock of nitrogen. That lime exhausts the soil was well understood by our forefathers, who expressed the fact by stating that its application enriches the father but impoverishes the son, and that if used without manure it makes both the farm and the farmer poor.

The reader should now readily understand why the first application of lime on a reclaimed soil in which decay was proceeding

slowly, and where vegetable matter had collected, was followed by the extraordinary results which our forefathers so vividly described. He should also understand why the effects of a second

Soil gradually loses Lime. application of lime are not always equal to those of the first. But lime has also the property of sinking rapidly into the soil, and this process may have gone on to such an extent that a fresh application is necessary, not only to make the passage of implements and water through the soil more easy, but also to hasten the decay of accumulations of vegetable matter and of portions of the subsoil which, under a system of thorough tillage, are steadily being brought to the surface.

Lime has other properties, too, which must be noted. It destroys the acids in sour soils. Plants, then, which thrive on sour soils, such as heather on bog, sorrel and some others

Further properties of Lime. on cultivated land, disappear after an application of lime. Finger-and-toe, a very destructive disease of turnips, also thrives in acid soils, and is prevented by lime. These results must not be expected too quickly, for lime requires a considerable time (about twelve months is the accepted period) before its effects manifest themselves. It is not, indeed, until lime has been completely blended with the soil, and until it comes into close contact with every particle, that in the true sense the soil can be said to have been limed.

One more property of lime remains to be mentioned. It cannot, without loss, be brought into contact with the solid or liquid excrements of animals, either in the byre, in the manure heap, or on the soil.

The practical questions put to the Department by farmers, and already summarised, may now be briefly, and, it is hoped, more intelligibly, answered.

From a written description it is not easy for everyone to recognise indications of the need for lime. These can only be perceived by those who are accustomed to closely watch the changes in soil.

Soils requiring Lime. Liming, however, is likely to be profitable on the following classes of land, viz.—(1) heavy soils, particularly those through which surface water passes with great difficulty; (2) soils of a lighter character if well stored with vegetable matter; (3) newly-drained or reclaimed soils; (4) old pastures, where there is no white clover, and particularly when the herbage is mainly composed of the plant known as agrostis or bent grass; (5) peaty and other sour soils; and (6) soils that are subject to finger-and-toe. Loams in a high state of cultivation, old pastures which are green in March, very light poor

THE LIMING OF LAND.



The effects of applications of varying quantities of Lime on Mustard grown in peaty soil.

soils, soils which are known to have been recently limed, and all wet soils need not be limed.

The effects of varying quantities of lime on mustard grown in pots with peaty soil are shown in a striking manner in the photograph reproduced opposite. Apart from the quantity of lime applied, all the pots were treated alike,

The chemical analysis of the soil is not a sure guide to the need of lime ; for lime, as we have seen, is not a direct manure, and is often used merely to correct soil defects which **Chemical Analysis** no analysis can disclose. To anyone who has a **of Soil only a** good knowledge of chemistry a soil analysis may **partial guide as to** afford some indication of the probable effects of **need of Lime.** lime. Farmers, however, even if they all understood the chemistry of soils, do not require to resort to chemical analysis to find out whether liming will pay them. There is a far simpler and surer method, which will well repay them to adopt, viz., to purchase of few loads of lime and apply it to selected spots on the farm. If a beneficial result is shown in the quantity and quality of the succeeding crops the whole field should be similarly treated ; but should there be no improvement the farmer would be ill advised to spend his money on lime.

The time of year at which lime should be applied to tillage land must depend to some extent on the crop. This is perhaps the least important of the questions to be answered here, **Season for** for if the land is in need of lime the main con- **the Application** sideration is to apply it as soon as possible, and **of Lime.** if the farmer succeeds in getting it put on in a powder, thoroughly distributed, and kept near the surface, it will matter but little in a few years whether it was applied in autumn, winter, spring or summer. There are, however, instances in which there is a right and wrong time to do the work. A good illustration of this is the application of lime as a preventive of finger-and-toe in turnips. We have seen that a year usually elapses before lime exercises its full effects on the soil. If the prevention of finger-and-toe be the object of liming the application must not be made in the winter or spring immediately preceding the sowing of the turnip crop. The lime must be applied at least twelve months earlier. It is customary in well devised rotations for turnips to follow oats after grass. For the prevention of finger-and-toe lime should be applied to the grass land before it is ploughed for oats. Lime, we have seen, rapidly sinks in the ground, and must become intimately blended with the soil if it is to have the desired effect. If, therefore, it be ploughed in deeply after oats the winter before the turnips are sown, the surface soil will receive little benefit ;

but if applied to the grass before that is ploughed for oats, and if the oat stubble is ploughed at the earliest opportunity, and the plough run an inch or two below the grass furrow, the lime will be brought to the surface and will exert its influence on the soil below it throughout the winter, while the spring cultivation for the root crop will thoroughly incorporate it with the soil.

The proper time to apply lime to grazing land is in autumn, when fields are bare and grazing is of small value. The earlier it is applied at the season of the year the more chance there is of escaping the rains which might turn the powder into a paste, and the more likely it is to yield a result next season. Lime may also be conveniently applied to young seeds in autumn, after the oat crop has been removed. To light land under tillage an excellent time to apply it is in spring, after roots, on the surface of the freshly-ploughed land which is about to be sown with oats and seeds. The pressure of work on the farm at this season is the chief drawback to this method.

The form in which lime should be applied needs no further description. It must be in the finest powder possible immediately it has been slaked.

The quantity that should be applied is a question difficult to answer. One general principle has already been stated, viz., the finer the powder, and the more even the distribution, the less will suffice. When lime is applied to strong soils for the purpose of making them more easily tilled and more pervious to water and air, fairly heavy dressings are necessary. For such purposes three tons per statute acre is the very least that will give satisfactory results. An additional ton in such a case might be given with advantage. For light soils, two tons per statute acre, if evenly distributed on the surface, will correct acidity, sweeten the herbage, increase clover, reduce bent grass, prevent finger-and-toe, and generally improve the quality and quantity of the crops. A two-ton dressing, however, must not be regarded as heavy and lasting; and it may require to be repeated after six or seven years.

The manner in which lime should be applied depends on the kind of soil, the object in view, the time of year and the amount.

Generally speaking, however, it is a good plan to cart the newly burned lime direct to the field, to lay it out in small heaps about six or eight yards apart, and, if the land be under tillage, to cover these heaps with a light layer of soil, and finally to spread as soon as it has fallen to a powder. Many farmers favour the practice of putting the quicklime into one or two large heaps in the field, and

slaking it with water. The powder is then put into carts, out of which it is spread with a shovel. This plan, however, necessitates more labour than the former method. It possesses the merit of yielding the finest powder, and is one to be recommended when seeds and pastures are being treated.

A word may be said here with regard to gas lime, which is, however, not within the reach of many farmers in Ireland. Fresh gas lime contains a considerable quantity of a

Gas Lime. poisonous material, and is most dangerous if applied to land that has been recently, or is soon to be, sown with seed of any kind. If gas lime is used it should be applied at least two months before the sowing of the seed. It should not be applied to grass land. Gas lime is often useful to and infested with wireworm and other insect pests. Apart from this, its value depends mainly upon the amount of ordinary mild lime it contains, and also on a small amount of nitrogenous compounds which gives it a slight manurial value.

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HUSK OR HOOSE IN CALVES.

“Husk” or “Hoose” is a parasitic disease which attacks calves, and sometimes lambs.

The disease is caused by small thread-like worms in the windpipe. Whether the worms enter the windpipe direct, or first enter the stomach with the grass and then work their way back up the gullet and into the windpipe, is not known. That they are present in the windpipe of affected animals, however, is certain. Their presence there sets up an irritation which causes the animal to cough, and as the worms feed by sucking the blood of the animal a lowering of condition naturally follows from the coughing and loss of blood.

The chief symptom of attack is a hard, husky cough. The animal becomes dull and listless and rapidly loses condition, and the skin becomes dry and hard. These symptoms are usually noticeable in the months of August, September and October, and unless remedial measures are promptly adopted death may result.

In most cases the animals attacked have been kept under one or more of the following conditions :—

(a) The calves have been grazing during late summer and autumn on strong, wet, or low-lying, marshy, undrained land.

(b) The calves have been allowed to lie out at nights during autumn, and have thus become chilled by the cold, damp atmosphere so characteristic of autumn evenings.

(c) The calves may have been starved through lack of the good nourishing food so necessary for young growing animals.

It will be readily understood therefore that prevention of the disease can best be effected by attention to the following precautions :—

(a) Calves should not be allowed to graze on wet or damp ground. The driest field and the finest and freshest herbage should be reserved for them. The application, in early winter, of either a medium dressing of lime, or of from 8 to 10 cwt. of salt per statute acre is often beneficial on land where calves are subject to the disease.

Where possible calves should be changed frequently to fresh pasture.

(b) Calves should not be allowed to lie out at nights during autumn, but should be comfortably housed.

(c) Calves should receive good wholesome food such as hay and a little linseed cake. Those that are well housed and well fed rarely suffer from husk.

If the proper steps be taken as soon as the symptoms of husk are observed, a cure may be effected, but it cannot be too strongly insisted that every day that passes between the appearance of the symptoms and the adoption of remedial measures renders the chance of successful treatment more remote, because the victim loses strength so rapidly that the parasites soon get the upper hand.

The Department have found the following treatment effective :—

Give once daily to each affected calf, according to size and age, from 1 to 2 tablespoonfuls of a mixture composed of :—

- 1 drachm oil of cloves.
- 8 oz. spirits of turpentine.
- 24 oz. linseed oil.

The dose should be given alone and before the animal is fed, and may be repeated daily for four or five days.

More drastic methods of curing the disease by intra-tracheal injections and by fumigation are sometimes adopted ; these, however, are delicate operations, and should not be undertaken except by qualified veterinary surgeons.

Copies of this article in leaflet form (No. 44 Revised) may be obtained free of charge, and post free, on application to the Secretary, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion Street, Dublin. Letters of application so addressed need not be stamped.

MARKETING OF FRUIT.

APPLES.

The profits of apple culture depend largely upon the fruit being carefully gathered and stored, honestly graded, and well packed in suitable packages, which should be of known standard capacities.

A clean, neat, new package helps the sale of its contents, and its cost is usually more than recovered in the extra price obtained.

Most apples imported into the United Kingdom are packed in barrels of about 24 to 27 gallons capacity, and in boxes of about one bushel capacity; these packages are popular on all markets, and have proved satisfactory for use for apples which are to be sent by rail or steamer.

Packers of Irish apples should use barrels and boxes of fixed standard sizes, for the following reasons:—

- (1) Buyers will know exactly what quantity of fruit the package contains: a package of known capacity can always be sold more readily than one of unknown and varying capacity.
- (2) Makers of boxes and barrels will know exactly what is required, and will therefore be in a position to supply them more rapidly and cheaply than would otherwise be the case.

The Department recommend that all packers of Irish apples should adopt and use the standard barrel and standard box, hereafter described, for apples which can be graded to the standards herein recommended, and that they should also adopt and conform to the grading conditions given below; it is only by such action that Irish-grown apples can be placed on the market in a condition to hold their own in competition with imported apples.

Standard Barrel for Apples.—The standard barrel for apples must be a good and strong barrel made of seasoned wood, free from strong odour, and of dimensions not less than, and as nearly as possible conforming to, the following:—

Between the heads, $26\frac{1}{2}$ inches, inside measurement.

Head diameter, 17 " " "

Middle diameter, $19\frac{1}{2}$ " " "

The barrel to be hooped with not less than six hoops, two of which must be on each end, and one or two on each bilge; the head and bottom of the barrel to be each not less than $\frac{1}{2}$ inch in thickness,

dressed, clean and sound, and bevelled to fit neatly into the croze or groove cut in the staves to receive it : outside lining hoops should also be supplied ; the barrel should be sent out with the head lining hoop nailed on, and the bottom lining hoop loose inside the barrel.

This barrel, when of the minimum dimensions given above, is of $26\frac{1}{4}$ gallons capacity, and will hold about 138 lbs. of apples weighing 42 lbs. per bushel.

Standard Box for Apples.—The standard box for apples must be a good and strong box, made of seasoned wood free from strong odour, and of the following dimensions, viz. :—

Length,	20	inches	inside	measurement.
Width,	11	„	„	„
Depth,	10	„	„	„

The end pieces should be not less than $\frac{1}{2}$ inch, nor more than $\frac{3}{4}$ inch, thick ; the sides not less than, and as nearly as possible, $\frac{3}{8}$ inch thick ; the tops and bottoms not less than, and as nearly as possible, $\frac{1}{4}$ inch thick ; the tops and bottoms should each be of two pieces of equal width and of such length that when nailed on they shall just cover the cross battens on the end boards, to which they should be nailed as well as to the vertical end pieces ; the sides should each be in two or more pieces, each piece to be not less than 3 inches wide and of the full outside length of the box ; the ends should each be in two or more pieces, each piece to be 10 inches in length and not less than 3 inches in width ; each end to have affixed to it externally two cross battens, each of which must be $11\frac{3}{4}$ inches long, and not less than $1\frac{1}{2}$ inches deep by $\frac{3}{8}$ inch in thickness ; these battens will not only hold the end pieces together, but will also provide convenient hand grips. The end pieces should be so affixed that there shall be a break of not less than one inch between a joint in the end pieces and the joint between the top or bottom boards. It is desirable that the spaces between the top, bottom, side, and end boards, respectively, should be not less than $\frac{1}{8}$ inch and not more than $\frac{1}{4}$ inch : ventilation is thus provided. Cement coated $1\frac{1}{2}$ inch, No. 14 gauge wire nails should be used. If the box is packed with a “swell” as recommended further on, four wooden cleats will be required, two for the top and two for the bottom, each measuring 11 inches long, by $\frac{3}{4}$ inch to 1 inch wide, and about $\frac{1}{4}$ inch thick ; the thickness of the cleat is governed by the amount of swell given in packing ; $\frac{1}{4}$ inch should be about right : the cleats protect the swell and strengthen the top and bottom.

This box will hold about 40 lbs. to 42 lbs. of apples.

Both boxes and barrels should be made of wood having a good appearance, and should be free from any objectionable odour when required for use.

The standard barrel and standard box above described have been adopted by the Ulster Fruit Growers' Association and other packers of Irish apples.

Grading Conditions.—Apples must be graded as to size so that no apple of a particular grade shall pass through a ring having an internal diameter as specified on page 139 for that particular grade of the variety in question, when the apple is placed stem down on a ring held horizontally.

The following conditions as to grading to be strictly observed :—

Select Grade.—Fruit must be well grown ; shape normal ; practically free from blemish, injury, or disease ; skin unbroken ; no decay.

First Grade.—Fruit must be well grown ; shape normal ; skin unbroken ; slight surface wounds permissible if skin has healed over same ; surface blemishes from scab, spot, or other insect or fungoid pests, or from decay, must not cover a total surface area exceeding the area of a sixpence.

Second Grade.—Fruit may be slightly deformed ; surface blemishes from scab, spot, or other insect or fungoid pests or from decay, must not cover a total surface area exceeding the area of a shilling ; slight surface wounds permissible.

The above specified grading conditions have been adopted by the Ulster Fruit Growers' Association.

Irish growers and shippers should endeavour, by strictly honest grading and packing, to attain such a reputation for Irish apples that Irish packages may be bought on their brand or mark without previous examination of the contents. It is obvious that one standard of grading should be universally adopted in Ireland. It is with that object in view that the Department have suggested the grading conditions above set out, and it is hoped that packers of Irish fruit will adopt the standard packages and grading conditions above described. Apples which are below second grade may generally, with advantage, be packed in cheaper packages.

GATHERING APPLES.

Much damage is done by rough handling when picking. Apples should be picked by hand, and handled with very great care ; if the sides and bottom of the receptacle into which the apples are placed as picked are rough, they should be lined with some material to prevent damage being caused to the fruits.

VARIETIES.	Select.	First.	Second.						
CLASS I.									
Bramley's Seedling, .) Warner's King, . .) Lord Derby, . . .) Peasgood's Nonsuch, .) Waltham Abbey Seedling, .) Grenadier,) Bismarck,) Queen,) Martin's Seedling, .) Ecklinville Seedling, .) Lady Henniker, . .) Gascoyne's Scarlet, .)	8½ inches	2¾ inches	2 inches						
CLASS II.									
Lady Sudeley, . . .) Charles Ross, . . .) Lanc's Prince Albert, .) Royal Codlin, . . .) Royal Jubilee, . . .) Dutch Codlin, . . .) Lord Grosvenor, . . .) Domino,) Blenheim Orange, . .) Early Victoria, . . .) Newton Wonder, . . .) Golden Spire, . . .) Allington Pippin, . .)				8 inches	2½ inches	2¼ inches			
CLASS III.									
Worcester Pearmain, .) Cox's Orange Pippin, .) Rival,) James Grieve, . . .) Gladstone,) Beauty of Bath, . . .) Kemp,) Irish Peach,) Cambusnethan Pippin, .) Ribston Pippin, . . .) King of the Pippins, .) White Transparent, . .) Queen Caroline, . . .)							2½ inches	2¼ inches	2 inches

STORING.

Apples should be handled very carefully when being moved from the orchard to the store, rough jolting in a springless cart is most objectionable: they should at once be graded into Selects, Firsts, Seconds, and Culls, and all apples which are bruised or affected by spot or scab, or the skin of which is broken, should be removed from sound apples and disposed of as soon as possible: any apples much affected by "spot," or having bruised or broken surfaces, are likely to decay rapidly and to cause injury to others; they should not, therefore, be mixed with sound apples. By grading before storing, the quantity of apples on hand of each variety and grade can be closely estimated, and the owner can at any time ascertain the quantity of any variety or grade on hands.

A satisfactory method of storing apples is to pack them in 6 hhd. or 3 hhd. egg cases, or boxes of a similar type; such egg cases will hold 140 or 70 lbs. of apples, respectively; apples would probably keep better in the smaller sized cases. The lids should not be fitted on, but it is a good plan to cover each filled box with paper; the cases may be tiered one over the other to a convenient height, say about 8 feet; they should be so stacked as to permit of inspection while in store. The store should be such that apples therein will not be exposed to extremes of heat or cold, dampness or dryness, or to draughts. A very suitable store would be one having an earthen or concrete floor, walls of brick or stone, and a roof so constructed as to provide against extremes of heat and cold; there should be sufficient light to permit of the proper examination of fruit when the door is closed; windows should preferably be on the north side. Sufficient ventilation can, as a rule, be provided by the doorway. The store should be kept clean. It is recommended that a store in which any appreciable quantity of diseased apples has been stored should, after their removal, be sprayed internally with a 1 per cent. copper sulphate solution before any more apples are stored therein, and it would probably be well to spray all storing boxes similarly once a year. The atmosphere of a store should be cool, and tend rather to dampness than to dryness. If the store is too dry, evaporation will take place; if too damp, the apples will mould; in either case the fruit will be spoiled.

GRADING.

It will probably suit many growers to grade apples direct from the pickers' baskets into the boxes in which they are to be sorted. Another plan would be to provide a grading table or stand of the type frequently used in Canada. It consists of a frame made like that of a stretcher bed, the upper ends of which are united on each side by

a piece of 2-inch by 2-inch wood, to which a piece of canvas is securely fastened, so that when the frame is opened out and the legs are braced apart, the canvas will form a tightly stretched sheet, on which the apples can be placed. This stand, which might when opened measure about 6 feet by 2 feet 6 inches, can readily be moved about. The apples may be taken from the pickers' baskets to this grading stand, from which they may be placed in boxes for storing; or, if they are to be sent at once to market, they may be packed in boxes or barrels for that purpose. If the apples are to be packed at once into bushel boxes for market, a packing table, as described under "Box Packing," page 148, should be provided. Apples should be handled with great care during the operation of grading, which should be strictly carried out in a good light, in accordance with the conditions laid down as to size, scab, spot, and diseased or damaged surfaces.

PACKING BARRELS.

Those who do not know how to pack apples in barrels and desire to do so, should endeavour to see the process carried out by an experienced packer; it may be thus shortly described:—The barrel, when received from the maker, should have a lining hoop clinched on the outside of one head, which is to be the head of the barrel when packed; this hoop is not to be moved; make sure that it is firmly clinched on, as hereafter described for clinching on the tail lining hoop; drive back and thus loosen the two hoops at the opposite or tail end of the barrel; the tail head will fall in, and its lining hoop should be found in the barrel; take out this head and the lining hoop, clinch any hoop nails projecting inside, and mark the head pieces and barrel, to indicate to which barrel the head pieces are again to be attached. A cooper's wooden driver will be useful for loosening and tightening the hoops.

If the apples have not already been graded, prepare three barrels for packing, one for each grade—Select, First and Second—into which the apples may be graded, so that as the grading proceeds the apples may be placed in the proper barrels, thus avoiding any unnecessary rehandling. Place a 9-inch by 3-inch plank about six or seven feet long on the ground and set the barrels on it with the open tail-ends up. It will be understood that the barrels now stand inverted, with the ends, which will be the heads of the barrels when packed, on the plank. The packing is commenced at the head, so that the apples may present a nice appearance when opened. Before commencing to pack, mark with pencil or chalk on the outside of each barrel the grade of apples which it is to contain: this will obviate errors in branding after the barrels have been headed. Proceed with each barrel as follows:—Place a disc of thin corrugated paper,

about $16\frac{1}{2}$ inch to 17 inch in diameter, on the inner side of the barrel head, taking care that the corrugations face the wood, thus leaving a smooth surface for the apples to bear against; if a lining disc is not available, substitute a very thin layer of wood wool, but a disc of corrugated paper is preferable; the paper disc or wood wool should be covered with a sheet of thin fruit packing paper; then place on this a layer of apples, which is to form the face; they should be fairly representative of the bulk to be packed in the barrel, and should be placed with all their stems turned towards the barrel head, unless, as is sometimes the case with some varieties such as "Bramley's Seedling," the apples have so much "heel" that it is better to pack this and the next layer with the eyes of all the apples turned towards the barrel head. Whenever it is possible to do so, without bruising the apples when squeezing down the tail of the barrel, as explained hereafter, the apples in these layers should be placed with their stems turned towards the barrel head, which is next the plank. Place the second layer by hand in the same manner, endeavouring to arrange the apples so that they shall rest over the interstices between those in the first layer, and yet that they shall be in as close contact as is possible without causing injury by bruising them. After placing the second layer, the apples may be gently turned into the barrel, provided that they are handled with great care during the process, to avoid bruising them. It will be found convenient to use chip baskets or small pails for this operation. While this is going on, the barrel should now and then be racked or shaken, just sufficiently to make the apples settle down; this can be done conveniently when the barrel rests on a plank, and the operation may be facilitated by the use of the "follower," which in any case must be used when the barrel has been filled to within six or eight inches of the tail end. The "follower" is a piece of wood, about $1\frac{1}{2}$ to 2 inches thick, circular, and $16\frac{1}{2}$ inches in diameter, lined underneath with saddler's felt or some other soft material that will stand wear, and fitted on the top with a handle. It is to be pressed against the apples, while the barrel is shaken, the object being to leave a level surface for finishing off the tail of the barrel. Frequent and efficient racking is essential to successful packing. The last two rows of apples are to be placed by hand like the first rows, great care being exercised to finish as level as possible. The apples when finished off should project slightly, say about $\frac{1}{4}$ to $\frac{1}{2}$ an inch above the groove cut in the staves to receive the head; the exact amount by which they should project must be learned by experience; it will depend to some extent on the variety; some varieties will take more pressure than others, but it will depend mainly on the efficiency of the racking given. Before pressing down the tail head, cover the last layer of apples with a corrugated disc or wood wool, as when beginning the head end of the barrel; if, owing to the packer's inexperience he cannot finish off with a fairly level tail, some tightly

pressed wood wool may be used to fill spaces left, but every effort should be made to use as little wood wool as possible, as it is likely to cause "slacking" if used in too great quantity. The head must now be pressed down by means of the screw barrel press, which can be very easily manipulated. The head must be pressed down until it slips into the croze or groove prepared for it; as soon as the press grips the head firmly, the barrel should be again racked vigorously; when screwing the head down it should be lightly tapped round the edge to make it slip into its place. If the barrel has been well racked, very little screwing down pressure will be necessary, and over pressure, causing damage, will be avoided. A beginner should experiment with inferior apples; and after pressing the head down into position he should remove it again to ascertain if damage has been done and if sufficient pressure has been applied. The object of pressing is to squeeze the apples firmly down so that there shall be no movement of apples after the barrel has been closed down, and yet that no apples shall be bruised by too great pressure. Before releasing the screw pressure, drive home the two end hoops, then remove the press, fix the lining hoop in position, and secure the head by driving six $1\frac{1}{4}$ inch, 15 gauge wire nails through the lining hoop, stave, and one of the outside end hoops, clinching any projecting nails. Then reverse the barrel, and at once affix the label or brand to the head.

A little practice will enable the operator to pack more quickly in this manner than by the old open-headed method. It is very important that the apples should be well shaken down while filling the barrel, and to finish off with a good level tail, so that one apple shall not be squeezed more than another. There should be absolutely no movement of apples in a well-packed barrel if it is shaken after having been headed down.

APPLIANCES REQUIRED FOR PACKING APPLES IN BARRELS.

Hammer, nails, cooper's driver, follower, plank, corrugated discs or wood wool, screw press, grading rings, rubber stamps or stencils, and labels.

PACKING BOXES.

Box packing is only recommended for dessert apples of Select and First Grades; it will seldom prove remunerative to pack cooking apples in boxes.

Box packing is much more difficult than barrel packing, and requires experience. The apples must be very closely graded as to size, and those in one box should be even in colour. As in barrel packing, the box is inverted, and packing is commenced on what is to be the head. First, place a sheet of thin corrugated paper on the

bottom of the box, taking care that the corrugations face the wood ; if this is not available, substitute therefor a very thin layer of wood wool ; then place in the box two sheets of thin lining paper, cut to about 32 inches long by 20 inches wide, and so placed as to overlap at the bottom of the box to fit close into the sides, and to leave enough to overlap again over the apples when packed : the ends of the boxes may be similarly lined with lining paper only. Then place the apples in the box in layers, fitting them as tightly as is possible without bruising. Do not place wood wool or paper between the apples, but if desired the apples may be neatly wrapped in suitable wrapping paper as described further on. Before commencing to pack, the packer should decide how many layers of apples, and how many rows of apples in a layer, he will have. The apples should be packed with all stems up, or with all stems down, or all on their sides, but not with some laid one way and some another way.

In order that the apples shall remain tightly packed during transit, it is necessary to finish off the last layer, which will form the bottom of the box, with a slight swell or bulge, which should amount to from $\frac{1}{2}$ inch to 1 inch above the box sides at the centre of the box, running off to almost nothing at the box ends : care is necessary to arrange the apples so that the pressure shall be nicely distributed when the bottom boards are pressed on, without bruising any fruit. Having arranged the swell, lap the side lining papers over the apples, cover with a sheet of corrugated paper or wood wool as when commencing, and nail on the bottom boards. If the packing is done as here recommended, with a swell, a wooden cleat, 11 inches long, by $\frac{3}{4}$ inch to 1 inch wide, and $\frac{1}{4}$ inch thick, should be nailed on to each end of the top and bottom boards, when nailing these boards on : the cleats serve to protect the bulge or swell from being bruised, when the boxes are stacked for transit, and they strengthen the tops and bottoms. A lever press, made specially for the purpose, is of much assistance when nailing down the bottom boards ; the press is fitted with iron bands which grip the ends of the boards and hold them down while they are being affixed : these presses cost about £2 each. If the box is packed with a swell as above recommended, the swell or bulge will be about $\frac{1}{4}$ inch to $\frac{1}{2}$ inch at the centre of the top and bottom, after the bottom boards have been attached. It will be understood that the thickness of the cleats is governed by the amount of swell given. If the box is packed, even tightly, without any swell, there is considerable risk that the contents will be too loose, and will suffer damage in transit. Canadian packers consider that there should be a swell of $\frac{3}{4}$ inch at the centre of both the top and bottom boards when the covers are nailed down, but so much swell is probably unnecessary for home-grown fruit, which will reach its destination rapidly.

There are many different styles of box packing ; to describe them in detail would occupy too much space. A beginner cannot do better than examine the packing of a newly-opened Oregon box, or obtain the services of an experienced packer for instruction.

For box packing it is advisable to provide a packing table, having a surface area of about four feet by three feet. The surface of the table should be covered with some suitable material to prevent injury to the apples, and a piece of hay rope or a lath should be tacked round the edge of the table to prevent the apples falling off.

All apples tend to evaporate after having been packed, and the vibration in a railway wagon makes them settle down, hence the necessity for tightly pressing them. If this is not done they will be too loose, and bruised surfaces will be the result. Beginners generally pack too loosely.

WRAPPING.

Many foreign packers wrap their best apples in paper when they are packed in boxes ; it would be well for Irish growers to try if it would be desirable to wrap their best box-packed apples. Wrapping paper can be obtained from any dealer in horticultural sundries ; it may, for convenience, be bought cut into pieces about 8 inches by 10 inches, or 10 inches by 10 inches. Wrapping papers are generally glazed on one side, which is placed next the apple. Sometimes waxed papers are used. It would probably be advisable not to wrap apples until they have sweated. Wrapping, as practised by American and Colonial packers, is said to protect the apples, to prevent the spread of disease, to add to appearance, to maintain the apple in better condition than otherwise, and it probably lessens evaporation.

MARKING BOXES AND BARRELS.

On the ends of boxes and on the heads of barrels the following particulars should be clearly marked by means of a stencil or rubber stamp, on the wood, or on labels pasted on to the wood, in letters or figures not less than $\frac{3}{8}$ inch long :—

- (1) The variety of the apple.
- (2) The grade of apple.
- (3) The packer's private mark.

It is a mistake to write these particulars with pen or pencil ; the packer should remember that the necessary particulars should be easily legible to anyone examining a lot of packages in a store ; rubber stamps are therefore strongly recommended. A neat, effective label such as that adopted by the Ulster Fruit Growers' Association, with the necessary particulars clearly printed thereon by means of

rubber stamps, creates a good impression on the buyer, whereas badly written, almost illegible markings have the opposite effect.

Paper labels should be carefully attached by means of strong paste made of boiled flour and water; the addition of one ounce of size to each pound of flour, before boiling, will greatly increase the adhesive properties of the paste. Carelessly attached labels are liable to be torn and detached in transit.

The packer's name and address should not appear on any package to be sent to a wholesale buyer or salesman, except with their approval.

OTHER METHODS OF PACKING APPLES FOR MARKET.

Apples may be packed in bushel or half-bushel baskets, which can usually be obtained from salesmen on moderate terms. Apples, so packed, should be carefully graded, and the basket should be filled to contain 21 lbs. or 42 lbs. net of fruit, unless other weights are required for the particular market to which it is to be sent. The apples should be covered with a piece of thin white or coloured packing paper, over which there should be a thick layer of ferns, flags, or wood wool, securely fastened down by laths or rods.

Non-returnable light wood half-bushel baskets, costing about 4d. each, are also largely used and found very suitable.

A method, very general in Ulster, is to pack the apples in second-hand barrels, headed with hay, straw, or wicker covers. This method of packing, though suitable for apples of inferior quality, is not recommended for adoption for select or first grade apples, nor for export to Great Britain: it is objectionable for the following reasons:—

(1) The barrels used are generally soiled, often otherwise damaged, and even when turned out by the best packers have a slovenly appearance.

(2) Pilfering during transit is easy, and not uncommon.

(3) Owing to the loose method of heading the barrel, there is considerable movement of the contents when it is changed from a vertical to a horizontal position; this tends to produce fresh bruises on the fruit; the looseness of the packing, as compared with that of a wooden headed pressed barrel, permits of greater injury to the fruit from vibration during transit. It is hoped that the use of this package will be discontinued, except for fruit below grading standard.

A considerable quantity of apples has been forwarded to Great Britain in 6 hhd. egg cases and specially constructed cases of about similar size; the apples are generally packed in straw or wood wool; such cases will hold about 126 lbs. of apples; apples thus packed are said to have given satisfaction, and, although this system of packing

is preferable to that last described, it is not one that can be recommended, and, like the system last referred to, should only be used for fruit that is below grading standard.

Crab apples, cider apples, and inferior apples of other varieties, not suitable for table or cooking, should be packed in sacks in quantities not exceeding 1 cwt., the sacks so tied at the mouth as to provide ears for a hand grip, and if more than one class of apple is included in one consignment, the sacks labelled to indicate the contents, whether "crabs," "sweets," or "sours," the two latter terms designating cider apples and table or cooking apples respectively.

There is a very large demand for cheap apples for eating and cooking; this includes the large class of apples that are worth more than jam fruit, and yet are not good enough to pass the standard for second grade apples. This class of fruit may well be marketed in bushel baskets, open headed barrels, or 6 hhd. egg cases.

Whatever system of packing is adopted, if apples are to be marketed in good condition and packed so as to present a taking appearance, they must be carefully graded, and handled with great care so as to avoid injury by bruising; this applies especially to early apples, which are generally very susceptible to injury.

Apple growers should realise that what the trade requires is a continuous supply of well graded, well packed apples of a particular known variety; they should therefore aim at procuring large quantities of those sorts which they can grow of good quality, and for which there is a steady demand.

STRAWBERRIES.

Chip punnets, filled to contain 1 lb. or $\frac{1}{2}$ lb. net of fruit, may be advantageously used for sending the very best fruit to market when good prices are obtainable. Their appearance is much improved if a few dark green flexible leaves are used to line the bottom and sides of the punnets, but care must then be taken not to diminish the correct net weight of fruit in each punnet. Punnets are packed in returnable wooden crates or cases, usually made to hold 24, 32 or 48 punnets. This method of marketing is more costly than the more common practice of using chip baskets, which are the best packages for general use for marketing strawberries for retail purposes. The best size of chip basket for strawberries is that of about one gallon capacity, which will hold 4 lbs. of berries. It should be lined with cheap parchment paper, and, when filled, a cover made of thin white or coloured paper, cardboard, or chip should be tied on. Care should be taken to select a size of basket which will just nicely hold 4 lbs. net of strawberries, and yet that the strawberries shall not rise above

the rim ; if the baskets are too small for the quantity of berries contained, the fruit is very liable to be damaged if, as is frequently the case, the baskets are stacked in transit ; under such conditions the fruit can be best protected by cardboard or chip covers. Buyers will frequently supply chip baskets and covers. Paper covers, with slits cut out for the handles, can be obtained from sellers of horticultural sundries. Strawberries for punnets or chip baskets should be picked with the stems on, and graded evenly as to quality. Pickers should, as far as possible, avoid touching the fruit, which should be placed directly into the punnets or baskets. All rough jolting of the packed chips should be avoided, as it would seriously damage the fruit.

Strawberries for jam should be picked without stalks, and are usually forwarded in kegs supplied by the buyers. So far as possible strawberries should be picked when dry, and kept as cool as possible after picking. Avoid picking partially or wholly unripened, over-ripe, damaged, or soiled berries. This is especially necessary when the fruit is required for retail purposes. It is better to gather strawberries rather under than over-ripe. They should be firm and bright in colour, not soft and dark.

RASPBERRIES.

These, like strawberries, may be marketed in the same type of packages, and subject to the same general conditions. Raspberries packed in chips for retail purposes are marketed both with and without the stalks. The sender should ascertain what best suits the particular market for which they are intended. They carry rather better with stalks on. Raspberries should be picked when firm and bright in colour, before they become soft and dark.

CURRENTS.

Chip baskets are on the whole the best packages in which to market currants. Red and white currants are often preferred in bunches ; that is to say, the currant is not removed from the stem. Black currants, when they ripen evenly, may be picked and marketed in bunches, but if the currants ripen unevenly it is best to remove them from the stems and to pick the bushes over three or four times as the currants ripen. Currants travel better when left on the bunches. Jam makers usually prefer to have black currants removed from the stems, and they will keep quite well when picked in this manner, if care is taken to pick them just before they are fully ripe. A chip basket of about 2½ gallons capacity will hold 14 lbs. of currants stemmed—that is, the currants removed from the stems. The gallon chip will hold 6 lbs. stemmed. The chip basket should be lined with parchment paper, and covered with paper, cardboard, or chip covers

tied on ; the cardboard or chip covers are preferable when the baskets are liable to be stacked during transit. Black currants should be picked when slightly tinged with red, just before they are fully ripe. If allowed to become dead ripe they are apt to burst when picked, and would be much damaged in wet weather. Avoid picking green and unripe berries, and do not mix bits of leaves and stalks with the fruit.

GOOSEBERRIES.

Very early unripe gooseberries may be marketed in chip baskets, as already described for strawberries, or in half-bushel and bushel baskets, which salesmen will usually supply ; these baskets should be covered as described for apples. Hard, unripe gooseberries for jam purposes may be sent forward in sacks holding not more than 1 cwt. Ripe gooseberries may be marketed in chip baskets of about one and two gallon sizes, or in circular half-bushel baskets ; these should be filled to hold 7, 14 and 28 lbs. respectively of fruit. The baskets should be covered with thin packing paper, cardboard, or chip covers, neatly tied down.

PLUMS AND CHERRIES

may be marketed in one gallon or two gallon chip baskets, in half-bushel non-returnable light wood baskets, or in peck or half-bushel wicker baskets, which should be filled to hold as follows :—

	1 gallon chip.	2 gallon chip and peck.	Half bushel basket.
Plums	7 lbs.	14 lbs.	28 lbs.
Cherries	6 lbs.	12 lbs.	24 lbs.

The chip baskets should be covered with thin, shaped packing paper neatly tied on. The half-bushels should be finished off with thin packing paper, covered with bracken, flags, or wood wool, fastened down by rods or laths as described for apples.

DAMSONS

when ripe may be treated in the manner described for plums. When unripe they may be packed in boxes, barrels or baskets. Not more than 56 lbs. of unripe damsons should be placed in one package. Larger quantities of unripe damsons are very liable to heat and deteriorate when transit is long.

GENERAL REMARKS.

The chip baskets recommended for use are those with fixed chip or detachable metal handles. Those with detachable handles occupy less space than the others when stored. Chip baskets should always be lined with thin parchment paper, so placed as to cover the inter-

stices between the chip plaits, otherwise the contents are liable to be damaged by dirt. Some chip baskets can be purchased lined with parchment paper. Ordinarily chip baskets are non-returnable, but when used for sending fruit to jam makers they may serve for three or four trips. They are a most excellent package for soft fruits, especially when the latter are forwarded by passenger train, as they are very light, and the fruit is less liable to heat than when placed in larger packages.

With the exception of graded apples packed in standard barrels or boxes, all the fruits above mentioned should be sold in packages containing guaranteed net weights of fruit, and such packages should always be filled to rather more than the guaranteed net weights to allow for loss of weight from evaporation or leakage of juice in transit.

So far as it is possible no fruits should be gathered when wet.

Pickers of currants, strawberries, and raspberries should be afforded facilities for washing their hands prior to and when picking. Buyers and salesmen will frequently provide packages, covers, and labels, and advise as to those most suitable. It is not advisable for growers of gooseberries or currants to bring previously used packages, as supplied by buyers for such fruits, on to their premises, as such a practice is a very possible means of introducing Black Currant Mite and Gooseberry Mildew.

All packages should be labelled, and correctly and fully invoiced, and consignees should be advised that shortage in weights invoiced must be notified immediately on receipt.

All fruits which can be graded, such as apples, plums, gooseberries, and strawberries, should be carefully graded.

Growers should remember that successful marketing depends largely on good grading and packing carefully in such a manner that the fruit will not suffer if carefully handled in transit, and that it shall present a taking appearance when offered for sale.

It is a great mistake to suppose that any sort of fruit, packed anyhow, will do for jam. The best buyers of jam fruits will always give the preference to a reliable packer, and will generally pay an enhanced price to obtain a reliable article delivered in good order.

Much good fruit is seriously damaged when moved from place to place in springless carts, and by exposure to rain and sun.

Copies of this article in leaflet form (No. 57 Revised) may be obtained free of charge, and post free, on application to the Secretary, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion Street, Dublin. Letters of application so addressed need not be stamped.

OFFICIAL DOCUMENTS.

I.—ADMINISTRATIVE.

DEPARTMENT OF AGRICULTURE AND TECHNICAL INSTRUCTION FOR IRELAND.

UPPER MERRION STREET, DUBLIN,
3rd October, 1913.

No. A. 13000/13.

SIR,

I have to transmit, for the information of your Council, the accompanying copy of the Department's circular letter, dated 1st instant, on the subject of the exclusion of Members of County Committees appointed under the Agriculture and Technical Instruction (Ireland) Act, 1899, from participating in the benefits of schemes administered by such Committees.

The special attention of your Council is directed to the second last paragraph in the circular.

I am, Sir,

Your obedient Servant,

T. P. GILL,

Secretary.

THE SECRETARY
OF EACH COUNTY COUNCIL.

DEPARTMENT OF AGRICULTURE AND
TECHNICAL INSTRUCTION FOR IRELAND,
UPPER MERRION STREET,
DUBLIN, 1st October, 1913.

No. A. 13000/13.

SIR,

I have to state for the information of your Committee, that a question having arisen as to whether a member of a County Committee is debarred from participating in the benefits resulting from County Schemes, the Department considered it advisable to submit the matter for the opinion of their legal advisers.

The Department are now advised :—

1. that under Article 12, paragraphs (3), (4), and (6) of the Schedule to the Application of Enactments Order, 1898, it is not lawful for a member of a Committee appointed under Section 14 of the Agriculture and Technical Instruction (Ireland) Act, 1899, to derive directly or indirectly financial benefit from the operations of *any* scheme administered by the Committee of which he is a member;
2. that a member who has obtained any such benefit is *ipso facto* disqualified for continuing to act on the Committee, and under paragraph (11) of the Order becomes liable to a

substantial fine for each occasion on which he acts or votes on the Committee subsequent to becoming disqualified ; and further;

8. that while a Committee appointed under the Agriculture and Technical Instruction Act may consist partly of members of the appointing Council and partly of other persons, the responsibilities and liabilities of each class of member are identical save that a member of the Committee who is also a member of the appointing body is, in addition to the penalties above mentioned, liable for a period of seven years to be disqualified for being elected a member of any Council or Board.

I have to add that as a Committee appointed under Section 14 of the Agriculture and Technical Instruction Act is a Committee of the body by which it was appointed, it follows from the foregoing that a member of the appointing body, although not a member of the Committee in question, cannot legally obtain any financial benefit from a scheme administered by such Committee.

Be good enough to submit this letter at the next meeting of your Committee.

I am,

Sir,

Your obedient Servant,

T. P. GILL,

Secretary.

THE SECRETARY

OF THE COMMITTEE

NAMED IN THE ADDRESS.

No. A. 22162/18.

DEPARTMENT OF AGRICULTURE AND
TECHNICAL INSTRUCTION FOR IRELAND,
UPPER MERRION STREET,

DUBLIN, 23rd October, 1918.

SIR,

Adverting to the Department's Circular, dated 1st instant, No. A. 18000/18, I have to acquaint you that the opinion of the Department has been sought by a number of Local Authorities as to the application of the terms of the Circular to contain specific cases. A summary of the Department's views on the several points submitted is enclosed for the information of your Committee.

The Department will be prepared to consider queries on any other matters on which the Committee may desire their views.

I am, Sir,

Your obedient Servant,

T. P. GILL,

Secretary.

THE SECRETARY,

EACH COUNTY COMMITTEE OF AGRICULTURE.

MEMORANDUM
ON POINTS WHICH HAVE ARISEN IN CONNECTION WITH
THE DEPARTMENT'S CIRCULAR, DATED 1st OCTOBER,
1918, No. A. 18000/18.

In the Department's view a Member of a County Committee or of a County Council becomes Disqualified :

1. If he is awarded by his Committee a nomination for his mare in the County over which authority is exercised by the Committee or Council of which he is a member.

2. If he receives from his Committee payment of any fee for the service by his registered stallion of a nominated mare belonging to any person who is resident or a rated occupier in said County ; but there is nothing to prevent him being paid such fees in respect of the service of mares selected for nomination in another County.

3. If he receives from his Committee payment of a premium for an approved bull or boar located in the county over which authority is exercised by the Committee or Council of which he is a member, but there appears to be no reason to prevent such a person, if within the limits of valuation prescribed by the County Committee having his cow or sow served (at the rate fixed by the County Committee for all persons of such valuation) by a premium bull or boar respectively standing in the county.

4. If he receives from his Committee payment of a premium for keeping an egg, goose, or turkey station in the county over which authority is exercised by the Committee or Council of which he is a member, but there appears to be no reason to prevent such a person, if within the limits of valuation (if any) prescribed by the County Committee, from obtaining (at the rate fixed by the County Committee for all persons of such valuation) a setting of eggs, etc., from any such station in the county.

5. If he receives from his Committee payment of a prize under the Flax Scheme or the Cottage and Farm Prize Scheme.

6. If he is concerned directly or through some person in his employment or through a partner in the sale of seeds, manures or other commodities or articles to his Committee.

On the other hand, such a Member :

7. Is not debarred by reason merely of being a member of a County Committee or County Council from being awarded prizes in competitions at shows subsidised but not managed by the Committee of Agriculture of that County.

8. Is entitled, like any other resident in the county, but subject to any restrictions as to valuation prescribed by the County Committee, to take advantage of any arrangement made by the Committee under Clause 9 of this Scheme.

9. Is entitled, like any other resident in the county, subject to any regulations made by the County Committee with the approval of the Department, to receive help and advice from any of the County Instructors employed by the Committee, and to attend lectures or classes conducted by any or all of these Instructors.

10. Is not disqualified through his son or daughter obtaining a Scholarship under the County Schemes. Provided, however, that he abstains from voting or taking any part in the discussion as to the award of such Scholarship.

11. Is not debarred by reason merely of being a member of a County Committee or County Council from being selected to carry out experiments or to have demonstration plots established on his land, or to receive from the Committee the special seeds and manures necessary for such experiments and demonstrations.

What is meant by the term "Indirect" Financial Benefit used in the paragraph marked I. in the Department's Circular?

The Department are advised that indirect financial benefit in this connection would be any benefit obtained by a member of a County Committee or a County Council either through a member of his family or any person in his employment or through a partner. In other words, it is illegal for a member of a County Committee or a County Council to make use of a partner or a member of his family or any person in his employment to obtain a benefit for himself which he is debarred from obtaining directly.

Results of Disqualification.

With regard to the present position of persons affected by the disabling clauses of the Application of Enactments Order, the Department consider that it would not be equitable to seek to disqualify a member of a County Committee or County Council who, prior to the date of the Department's Circular, viz., 1st instant, may have innocently obtained financial benefit from the schemes administered by his Committee, provided that such member now renounces claim to any benefit to which he might otherwise become entitled subsequent to the 1st instant.

II.—AGRICULTURE.

DEPARTMENT OF AGRICULTURE AND
TECHNICAL INSTRUCTION FOR IRELAND,
UPPER MERRION STREET, DUBLIN.

No. A. 12599/13 (CIRCULAR).

24th June, 1913.

PACKAGES FOR BLACKBERRIES.

SIR,

The Department have been informed by a number of the largest buyers of blackberries in Great Britain that the adoption, by many Irish shippers, of the re-cooped butter-kiel, as recommended in Department's leaflet, No. 93, has resulted in fruit thus packed reaching its destination in very much better condition than was formerly the case.

The Department are pleased to learn that the use of such packages by Irish shippers is rapidly increasing, and it is hoped that the practice of shipping blackberries in large casks will soon be entirely discontinued.

Complaints have been received by the Department in regard to the leakage of juice from kiels during transit. This is, of course, unsatisfactory as it results in a loss of weight of the contents, and may occasion friction between buyers and sellers arising out of claims in connection with such loss. It is, therefore, strongly recommended that kiels to hold blackberries should be filled with fresh water some days before they are required for use. They should

become quite staunch if kept full of water during from ten to fourteen days, and the wood will not then absorb any more liquid. The kiels should be allowed to drain thoroughly before being filled with blackberries. This is a simple method of treatment which has given good results.

Shippers of blackberries who have not a sufficient stock of kiels on hand for the coming season's trade should arrange, without delay, for the obtaining of their requirements.

A list of coopers from whom kiels could be procured was given in Department's circular letter of the 27th June, 1912 (No. A. 18223/12).

I am,

Sir,

Your obedient Servant,

T. P. GILL,

Secretary.

III.—TECHNICAL INSTRUCTION.

FORM S. 33.

DEPARTMENT OF AGRICULTURE AND TECHNICAL INSTRUCTION FOR IRELAND.

UPPER MERRION STREET, DUBLIN.

ROYAL COLLEGE OF SCIENCE, DUBLIN.

SCIENCE AND TECHNOLOGICAL SCHOLARSHIPS, 1914.

A limited number of Scholarships and Teacherships-in-Training, tenable at the Royal College of Science, Dublin, will be offered for competition among Students of Science and Technology in 1914.

The Scholarships are of the value of £50 per annum, and, in addition, entitle the holder to free instruction during the Associate Course, and third-class railway fare for one journey each session to and from Dublin.

A Teachership-in-Training entitles the holder to free instruction during the Associate Course, a maintenance allowance of 21s. per week for the session of about forty weeks each year, and third-class railway fare for one journey each session to and from Dublin.

The Associate Course extends over four years, and the College session lasts from the beginning of October to the end of June each year.

Candidates awarded Teacherships-in-Training will be required to enter into an undertaking that they will pursue the full Associate Course, with a view to becoming Teachers of Science in Ireland, and that, in the event of their leaving the College before obtaining the Diploma of Associateship, they will refund to the Department the sums paid to them as maintenance allowance and expenses of travelling.

Holders of Scholarships and Teacherships-in-Training will be required to devote their whole time to the work of the Associate Course, to comply with the regulations of the College, and to pass the examinations required for the Associateship. The continuance of the Scholarship or Teachership-in-Training from session to session will depend upon the ability and application which the student has shown during the previous session or sessions at the College.

Holders of Scholarships and Teacherships-in-Training who may seek leave of absence from attendance at the College in order to attend examinations for Scholarships in other Institutions will be required to pay first the College Fee for the current term.

Candidates for Scholarships and Teacherships-in-Training must be not less than sixteen nor more than thirty years of age on the 1st June, 1914. Holders of Royal Scholarships (or, under former regulations, Royal Exhibitions or National Scholarships), awarded by the Board of Education, London, and present or past students of the Royal College of Science, are ineligible as candidates.

Candidates must have been born in Ireland, or have been resident in Ireland for three years immediately prior to the 1st June, 1914.

Candidates will have to satisfy the Department as to their knowledge of English and of one other language (Greek, Latin, Irish, French, or German). In these subjects a pass in the Senior Grade of the Intermediate Education Board's Examinations, or the equivalent of this, will be accepted as satisfactory. Those candidates who cannot thus satisfy the Department as to their knowledge of the qualifying subjects will be examined on the Syllabuses prescribed for the Entrance Examination to the Royal College of Science.

The *competition* will be confined to Mathematics, Experimental Science, and Drawing.

The Syllabus in Mathematics will be the *Honours* Courses in Arithmetic with Algebra, Geometry, and Trigonometry for the Senior Grade of the Intermediate Education Board's Examinations of 1914.

In Experimental Science, candidates will be allowed the choice of one of the following subjects of the Special Courses of Experimental Science of the Department's Programme for Day Secondary Schools:—Physics, Chemistry, Mechanics, Botany, Physiology and Hygiene, Physical and Commercial Geography. The papers set may, however, include questions on the work of the Two Year Preliminary Course.

The Syllabus in Drawing will be the First and Second Year Syllabuses of the Programme for Day Secondary Schools.

NOTE.—Text Books, other than those referred to in the Syllabuses, are not prescribed for the examinations.

The examination will be held in Dublin on the days and at the hours shown below:—

Tuesday, 30th June.—Greek, Latin, Irish, French or German, 2 p.m. to 5 p.m.

Wednesday, 1st July.—Mathematics (First Paper), 10 a.m. to 1 p.m.; Experimental Science (Written Examination), 2 p.m. to 5 p.m.

Thursday, 2nd July.—Mathematics (Second Paper), 10 a.m. to 1 p.m.; Experimental Science (Practical Examination), 2 p.m. to 5 p.m.

Friday, 3rd July.—Drawing, 10 a.m. to 1.10 p.m.; English, 2 p.m. to 5 p.m.

(These dates are subject to alteration.)

Candidates must themselves bear any expenses incurred by them in connection with attendance at the examination.

Scholarships or Teacherships-in-Training will not be awarded to candidates who do not show in the course of the examination that they are capable of taking full advantage of the instruction pro-

vided at the Royal College of Science. Candidates with physical defects of voice, sight, or hearing, will not be regarded as eligible for Teacherships-in-Training.

Successful candidates will be required to furnish a Medical Certificate of Health, an authenticated copy of Certificate of Birth, and satisfactory testimonials from two responsible persons.

The Department reserve the right at any time to determine without notice a Scholarship or Teachership-in-Training, upon being satisfied that its continuance is for any reason undesirable.

The decision of the Department in all questions arising in connection with the Scholarships and Teacherships-in-Training shall be final.

The Department do not undertake to employ Teachers, nor to find employment for them, at the close of the period of training.

Applications for admission to the examination must be made not later than the 30th April, on Form S. 34, copies of which may be obtained upon application to the Secretary, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion Street, Dublin, or to the Registrar, Royal College of Science, Upper Merrion Street, Dublin.

Applications received after the 30th April will be too late for consideration. Applications for forms are not regarded as applications for admission to the examination. Only those candidates who present an official card of admission will be permitted to attend the examination.

FORM S. 106.

DEPARTMENT OF AGRICULTURE AND
TECHNICAL INSTRUCTION FOR IRELAND,
UPPER MERRION STREET, DUBLIN,

**SPECIAL EXAMINATIONS IN ELEMENTARY MODELLING
AND IN DRAWING ON THE BLACKBOARD.**

The Department will hold in October and November, 1913, Special Examinations in Elementary Modelling and Drawing on the Blackboard, for Candidates for the Irish Secondary Teachers' Drawing Certificate, under the conditions of Circular 84, and in Blackboard Drawing, for Candidates for the Teachers' Certificates in Drawing and Art specified in Form S. 240.

Should a sufficient number of applications be received, arrangements will be made to hold these Examinations in Dublin, Belfast, Cork, Londonderry, Limerick, Waterford, and Galway. Examinations may, however, in special circumstances, be held at other centres, but applications for such Examinations must be submitted separately not later than the 1st September, and must be accompanied by a statement of the circumstances in each case.

Applications for admission to the Examinations must be submitted not later than the 15th September, on Form S. 117 in the case of Elementary Modelling, and on Form S. 119 in the case of Drawing on the Blackboard. Copies of these forms may be obtained, after the 15th August, from the Offices of the Department.

The Department will not charge a fee for admission to these Examinations, but the Managers of the schools at which the Examinations will be conducted will be at liberty to charge each candidate a fee not exceeding 2s. 6d. for the accommodation provided. |

FORM S. 815.
Revised—September, 1918.

DEPARTMENT OF AGRICULTURE AND
 TECHNICAL INSTRUCTION FOR IRELAND,
 UPPER MERRION STREET, DUBLIN.

CONDITIONS FOR THE CONDUCT, IN TECHNICAL SCHOOLS
 AND DURING ORDINARY NATIONAL SCHOOL HOURS,
 OF CLASSES IN DOMESTIC ECONOMY (COOKERY AND
 LAUNDRY-WORK) FOR NATIONAL SCHOOL PUPILS.

(1) Any pupil who is in the Fifth, or a higher, Standard may be enrolled, but girls who have reached the age of eleven may also attend, even though they are enrolled in a lower Standard than the Fifth.

(2) A course of instruction in Cookery must extend over five months in the year and must include not less than twenty-five lessons of one and a-half hours' duration each. A course of instruction in Laundry-work must extend over five months in the year, and must include not less than twenty lessons of one and a-half hours' duration each. A course of instruction in the alternative syllabus in Cookery and Laundry-work, combined as a single subject, must extend over five months and must include not less than twenty-five lessons of one and a-half hours' duration each. Of these lessons at least fifteen must be lessons in Cookery, and six, lessons in Laundry-work.

(3) The attendance of girls at instruction must be recorded in special registers (Form S. 27), and attendance must be marked before the beginning of the lesson. A pupil may not receive credit for attendance at a lesson on any day (except Saturday) on which she has not been in attendance at the National School.

(4) The Syllabuses of instruction shall be those prescribed by the Commissioners of National Education in their Rules and Regulations in force for the time being.

(5) Classes, as a general rule, should be limited to twenty pupils, and in no case should this number be exceeded by more than three or four.

(6) The Managers of National Schools desirous of entering pupils for instruction in Domestic Economy in Technical School classes must produce a letter from the Secretaries to the National Board containing the sanction of the Commissioners as prescribed by Rule 128 (e) (1) of their Rules and Regulations.

(7) The classes shall be at all times open to the Inspectors of the Department, who will report to the Department as to the character and efficiency of the instruction.

(8) The conduct of the classes may not entail any charge on the funds of the Technical Instruction Scheme.

(9) Applications for copies of the Attendance Register (Form S. 27) should be made on Form S. 46. A separate Register must be used for each class. Claims for grants in respect of attendances made before the receipt by the managers of the official Registers will not be entertained.

(10) A Time-Table of the classes must be furnished to the Department on the Flyleaf to Form S. 46, within a fortnight after their opening.

The Commissioners of National Education will make a grant of seven shillings and sixpence in respect of each girl taught Domestic Economy, under the conditions set out above, who has attended at least 50 per cent. of the prescribed minimum number of lessons in the subject taught. The grant will not be paid for the same pupil for more than two years in Cookery, one year in Laundry-work, nor for more than three years in the alternative syllabus in Cookery and Laundry-work combined as a single subject. Not more than one grant will be paid in respect of the same pupil in the same year.

Pupils who have already taken up the courses in Cookery and Laundry-work as separate subjects must continue to follow the courses in these subjects, and those pupils who, in future, take up the alternative syllabus in Cookery and Laundry-work must adhere to it.

The grant may be reduced or withheld if the proficiency attained is not satisfactory.

CIRCULAR '84.
Revised.

DEPARTMENT OF AGRICULTURE AND
TECHNICAL INSTRUCTION FOR IRELAND,
UPPER MERRION STREET, DUBLIN.
August, 1913.

SIR or MADAM,

Owing to the alterations which have been made by the Board of Education (London) in their Scheme of Art Examinations, it has become necessary for the Department to revise the conditions under which they have hitherto awarded their Teaching Certificates in Drawing. It is proposed that, in future, these Certificates shall be awarded on the results of Examinations based upon the Art Courses of the Department's Programme of Technical School Examinations. There will be three kinds of Certificates, viz., the Secondary School Teachers' Elementary Drawing Certificate, the Secondary School Teachers' Advanced Drawing Certificate, and the Art Teachers' Certificate. The conditions under which these Certificates will be awarded are fully set out in Form S. 240.

When preparing the conditions for the new Certificates, the Department also had under consideration the cases of those candidates who have already made some substantial progress towards the Irish Secondary Teachers' Drawing Certificates, and who may be desirous of completing the requirements for these Certificates. They are anxious to avoid, as far as possible, disturbances to courses of study already within measurable distance of completion, and, accordingly, they have decided to afford special facilities, as set out below, to candidates for the Irish Secondary Teachers' Drawing Certificate. The cases of candidates for the Irish Secondary Teachers' Honours Drawing Certificate will be considered individually, and applications for such consideration should be made as early as possible by letter setting out fully the progress already made by the candidate towards the completion of the Certificate.

Special examinations in Freehand Drawing, Model Drawing,

Drawing in Light and Shade from a Cast, and Elementary Design, for candidates who have already obtained not less than three of the successes towards the Irish Secondary Teachers' Drawing Certificate, will be held in February, 1914, the examinations being based upon the Syllabuses prescribed for the Board of Education's examinations in these subjects, held in 1912. Special Examinations in Elementary Modelling will also be held for such candidates at local centres in 1913 and 1914; these examinations will, as heretofore, be held during the months of October and November. For the other successes required for the Certificate, viz., in Geometrical Drawing and Blackboard Drawing, the Department will accept successes at their special examinations in Geometrical Drawing and Blackboard Drawing, particulars of which are set forth in Form S. 240.

The Department's Technical School Examinations will be held in May each year, and candidates wishing to present themselves for examination must make application early in March to the Managers of a local centre at which examinations in the subjects desired will be held. Should a candidate experience any difficulty in ascertaining the nearest centre to his address where examinations will be held, the Department will be pleased to assist him upon application.

Copies of the Programme of Technical School Examinations may be obtained (price 2d., postage extra), either directly or through any bookseller, from E. Ponsonby, Ltd., 116 Grafton Street, Dublin.

I am,

Sir or Madam,

Your obedient Servant,

T. P. GILL,

Secretary.

CIRCULAR 85.

Revised.

DEPARTMENT OF AGRICULTURE AND

TECHNICAL INSTRUCTION FOR IRELAND,

UPPER MERRION STREET, DUBLIN.

August, 1913.

CERTIFICATES FOR TEACHERS OF DRAWING AND ART.

SIR or MADAM,

The Department have had under consideration inquiries which they have received respecting the steps to be taken by teachers of Drawing, who already hold the Irish Secondary Teachers' Drawing Certificate or equivalent qualifications, to enable them to obtain such higher certificates in Art as the Department may recognise. The Department fully realise that many such teachers may hope to secure higher qualifications than those mentioned, but may be unable to devote sufficient time to their Art studies to enable them to obtain the Teaching Certificate for Teachers of Art proposed to be issued by the Board of Education (London). At the same time it is desired that such teachers should not be put to the inconveni-

ence and expense which would be involved by their attendance at the more elementary of the examinations prescribed for the Art Courses of the Department's Technical School Examinations, in order that they may become eligible for the Art Teacher's Certificate under the conditions of Form S. 240.

It has been decided, therefore, to form a Register of candidates for the Art Teacher's Certificate who will be exempted from attendance at the more elementary examinations in the Art Courses, and who will be eligible for the Certificate when they have satisfied the following conditions :—

- (i) Obtained First Class successes in each subject of the Fourth Year Examination in any Group of the Courses in Art, and First Class successes in Subject II. of the other two Groups.
- (ii) Satisfactorily executed one finished study of importance in Object Drawing ; in Subject II. (Group A, B, or C) ; and in Subject III. (Group A, B, or C).
- (iii) Obtained successes in the Department's special examinations in Geometrical Drawing, Perspective, Methods of Teaching Drawing, Stage 3, and Blackboard Drawing.
- (iv) Have satisfactorily taught Art Classes in a Technical School or School of Art, or the Special Course in Drawing in a Day Secondary School, for one complete Session.

The minimum qualification for admission to the Register will be the Irish Secondary Teachers' Drawing Certificate, or its equivalent.

Applications for admission to the Register must be made by letter, but such applications need not be made by teachers who have already been awarded the Irish Secondary Teachers' Drawing Certificate.

It must be clearly understood that the Department cannot sanction any other deviation from the conditions of award of the Art Teacher's Certificate, nor will they accept towards this Certificate successes obtained at any examinations other than those specified in Form S. 240.

The Department's Technical School Examinations will be held in May each year, and candidates wishing to present themselves for examination must make application early in March to the Managers of a local centre at which examinations in the subjects desired will be held. Should a candidate experience any difficulty in ascertaining the nearest centre to his address where examinations will be held, the Department will be pleased to assist him upon application.

Copies of the Programme of Technical School Examinations may be obtained (price 2d., postage extra), either directly or through any bookseller, from E. Ponsonby, Ltd., 116 Grafton Street, Dublin.

I am,

Sir or Madam,

Your obedient Servant,

T. P. GILL,

Secretary.

NOTES AND MEMORANDA.

According to the recently issued Report on the Trade in Imports and Exports at Irish Ports during the year ended **Agricultural** 31st December, 1912 (Cd. 7059) the chief **Exports in 1912.** cultural export of Ireland is that of live stock, amounting in 1912 to a total estimated value of £12,326,819, a decrease of over £1,000,000 as compared with the export of 1911. This decrease was occasioned by the restrictions on movements of live stock necessitated by the outbreak of Foot and Mouth Disease. The total value of the exports of cattle in 1912 is estimated at £8,288,786 as compared with £9,566,393 in 1911. The total number of cattle shipped in 1912 amounted to only 555,321, which is the lowest figure on record since 1878, when the published returns of the exports of animals from Ireland were first issued. The number of horses exported showed a substantial increase, rising from 31,710 in 1911 to 34,849 in 1912, the increase in value being estimated at £153,350.

The returns show an increase in the export of poultry as compared with 1911, the estimated value exported in 1912 amounting to £1,037,771. It is estimated that one-third of this value consisted of live poultry.

There is a decrease in the quantity of eggs exported in 1912 as compared with 1911. The value in 1912, however, is only slightly less than that for 1911. The exports of eggs and poultry together in 1912 were valued at £3,964,353, and if to this is added the export of feathers a total export of £4,007,693 is recorded. These figures do not include the value of the poultry, eggs, etc., sent by parcel post, which cannot be ascertained.

The quantity of butter exported in 1912 was greater than in any of the four previous years. The total quantity exported was 778,778 cwts. and the value was £4,159,972. As in the case of poultry and eggs, these figures do not include quantities sent by parcel post. There is also a difficulty in obtaining a record of small consignments of butter under 28 lbs., as these are frequently returned as "parcels" or "sundries."

Much the largest import among grain foods for human consumption is wheat and wheat flour, the quantity and value **Imports.** for 1912 being as follows:—Wheat imports 7,471,974 cwts. having a value of £3,800,122; wheat flour imports 4,775,622 cwts. with a value of £2,586,795.

The imports of oats amounted to 545,066 cwts. The quantity of barley imported amounted to 1,162,584 cwts. as compared with 1,152,823 cwts. in 1911.

Among cattle feeding stuffs the chief import is maize, a very great quantity of which is annually imported into Ireland. The quantity of maize imported in 1912 was 13,582,134 cwts. having a value of £4,244,417. Together with these imports of maize the imports of bran, pollard, and the various classes of cattle meals brought the total value of cattle feeding stuffs imported in 1912 to a sum estimated at £5,687,012 as compared with £4,443,251 in 1911.

The General Abstracts showing the acreage under Crops and the number and descriptions of Live Stock for the year 1913 (Cd. 7063) has been published recently. The Irish Crops in 1913. total area of corn and green crops, including flax and fruit, amounted in 1913 to 2,348,583 acres as compared with 2,358,056 acres in 1912, a decrease of 9,473 acres or 0·4 per cent.

CORN CROPS.

The following summary shows the acreage under the several corn crops in 1912 and 1913 :—

	1912.	1913.	Increase.	Decrease.
	Acres.	Acres.	Acres.	Acres.
WHEAT,	44,855	34,004	—	10,851
OATS,	1,046,000	1,048,913	2,913	—
BARLEY AND BERE,	165,367	172,948	7,581	—
RYE,	7,765	6,723	—	1,042
BEANS,	1,421	1,264	—	157
PEASE,	279	211	—	68
TOTAL,	1,265,687	1,264,063	10,494	12,118
Net Decrease,	—	—	—	1,624

Wheat.—There is a decrease of 10,851 acres or 24·2 per cent. in the total area under wheat.

Oats.—There is an increase of 2,913 acres or 0·3 per cent. in the total area under oats.

Barley and Bere.—There is an increase of 7,581 acres or 4·6 per cent. in the total area of barley and bere.

Rye.—There is a decrease of 1,042 acres or 13·4 per cent. in the total area of rye.

Beans and Pease.—There is a decrease of 225 acres or 13·2 per cent. in the total area of beans and pease. The area of beans in 1913 is 1,264 acres as compared with 1,421 acres in 1912, a decrease of 157 acres. The total area of pease in 1913 is 211 acres as compared with 279 acres in 1912, a decrease of 68 acres.

GREEN CROPS.

The following summary shows the area of green crops in 1912 and 1913, and the increase or decrease of the several crops :—

	1912.	1913.	Increase.	Decrease.
	Acres.	Acres.	Acres.	Acres.
POTATOES,	595,184	582,313	—	12,871
TURNIPS,	271,771	276,596	4,825	—
MANGELS AND BEET ROOT, . .	81,700	78,914	—	2,786
CARROTS,	1,332	1,221	—	111
PARSNIPS,	651	588	—	63
CABBAGE,	37,950	35,043	—	2,907
VETCHES,	2,008	2,267	259	—
RAPE,	3,110	3,132	22	—
OTHER GREEN CROPS, . . .	28,383	29,407	1,024	—
TOTAL,	1,022,089	1,009,481	6,130	18,738
Net Decrease,	—	—	—	12,608

Potatoes.—The total area of potatoes in 1913 is 582,313 acres as compared with 595,184 acres in 1912, a decrease of 12,871 acres or 2·2 per cent.

Turnips.—The total area of turnips in 1913 amounts to 276,596 acres as compared with 271,771 acres in 1912—an increase of 4,825 acres or 1·8 per cent.

Mangels and Beet Root.—The area of mangels and beet root in 1913 is 78,914 acres as compared with 81,700 acres in 1912—a decrease of 2,786 acres or 3·4 per cent.

Cabbage.—The area of cabbage in 1913 is 35,043 acres as compared with 37,950 acres in 1912, a decrease of 2,907 acres or 7·7 per cent.

Minor Green Crops.—The area under carrots has decreased by 111 acres, that under parsnips by 63 acres. There are increases of 259 acres in vetches and 22 acres in rape. “Other Green Crops,” i.e., such as are not specified among the foregoing, show an increase amounting to 1,024 acres.

FLAX.

The area under flax is 59,305 acres in 1913 as compared with 55,062 acres in 1912—an increase of 4,243 acres or 7·7 per cent. The increase is general throughout the flax-growing counties. In Antrim there is an increase of 1,152 acres, in Armagh of 347 acres, in Cavan of 187 acres, in Donegal of 381 acres, in Down of 701 acres, in Fermanagh of 72 acres, in Londonderry of 608 acres, in Monaghan of 40 acres, and in Tyrone of 643 acres.

FRUIT.

The total area of fruit is returned in 1913 at 15,734 acres as compared with 15,218 acres in 1912—an increase of 516 acres or 3·4 per cent. There are increases in all the four provinces.

HAY.

The total area of hay in 1913 is returned as 2,481,862 acres as compared with 2,487,349 acres in 1912—a decrease of 5,487 acres or 0·2 per cent.

—	First Year's Hay.	Second and Third Years' Hay.	Hay from Permanent Meadow.
	Acres.	Acres.	Acres.
1912,	523,889	393,087	1,570,373
1913,	531,125	378,817	1,571,920
Increase, or]Decrease,	+ 7,236	— 14,270	+ 547
Percentage,	1·4	3·6	10·1

The area under hay has decreased in Leinster and Munster, and increased in Ulster and Connaught.

PASTURE.

The area of pasture, including mountain grazing, is returned as 12,409,074 acres in 1913, as compared with 12,411,858 acres in 1912—a decrease of 2,784 acres. When considering these figures of pasture area it should be remembered always that there are certain areas which it is difficult to classify, and which one year may be returned as “grazed” land, and another year may be returned as turf bog or barren mountain; but the grazing value of these areas is small.

The important increase or decrease in pasture is best measured by the extent to which the area of crops and of hay has decreased or increased, for in such a statistical inquiry as is being dealt with here the extent of the area under crops can be more exactly determined than the area of grazing land.

Numbers of Live Stock. The following are the changes in the numbers of live stock in 1913 as compared with 1912 :—

	1912.	1913.	Increase.	Decrease.
HORSES,	617,532	614,482	—	3,050
MULES AND JENNETS,	30,911	30,338	—	573
ASSES,	243,437	243,339	—	98
CATTLE,	4,848,498	4,932,625	84,127	—
SHEEP,	3,828,829	3,620,724	—	208,105
PIGS,	1,323,957	1,060,360	—	263,597
GOATS,	252,722	246,348	—	6,374
POULTRY,	25,525,724	25,701,342	175,618	—

Horses, Mules, Asses.—The total number of horses has decreased by 3,050. The total number of mules and jennets has decreased by 573. The number of asses has decreased by 98.

Cattle.—The total number of cattle shows an increase of 84,127. The total number of cattle is the highest yet recorded.

(1) The number of milch cows, including heifers-in-calf, is 1,605,220, showing an increase of 6,234 as compared with 1912. The total number of milch cows (including heifers-in-calf) is the highest on record since 1860.

(2) As regards other cattle there is an increase of 11,108 in calves, of 38,196 in cattle one year old and under two years, and of 28,594 in cattle (including bulls) two years old and upwards. The increase in the number of cattle one year old and under two years is general throughout the four provinces.

Sheep.—The total number of sheep is returned in 1913 at 3,620,724, being a decrease of 208,105 as compared with 1912.

Pigs.—The total number of pigs has decreased by 263,597.

Goats.—There is a decrease of 6,374 in the number of goats.

Poultry.—The number of poultry returned in 1918 amounts to 25,701,842 as compared with 25,525,724 in 1912, showing an increase of 175,618 in 1918.

The Third International Congress of Farmwomen was held in June last, at Ghent, and was attended by delegates from many lands.

**Inter-
national
Congress
of
Farmwomen.**

The work of the Congress was divided into three Sections, the first of which received and discussed the reports sent in by each country on the progress of the movement and the work done by the associations there. These reports gave a great deal of valuable and inspiring information and combined to show the very happy results already achieved by the women's movement in agriculture. In Belgium, for instance, the number of *cercles de fermières* is now about 200 and is daily increasing ; indeed, it is hoped, in time, to have a *cercle* in every parish. The Polish organisation, which was formed only in 1910, already comprises 92 *cercles de fermières* and also 61 *cercles* whose members are women landed proprietors. The "United Irishwomen," also established in 1910, contributed a very interesting and encouraging report on their work in rural Ireland. Other valuable reports were received from Canada, the United States, France, Hungary and other countries. Admirable papers were read on a number of technical subjects, such as the conservation of milk, poultry-keeping, kitchen gardening, care of young stock and farm book-keeping and accounts. In another Section questions of hygiene, rural recreation, the ornamentation of the farmhouse were discussed, as was also the importance of thrift and of organisation for mutual aid. This Section also dealt with the difficult problem of how to keep the people on the land, and various suggestions were made showing what women might do to instil into their children a love of the country and of rural life. Altogether the work of the Congress, whilst being thoroughly practical, was of a nature to stimulate and inspire all who are working for the betterment of rural conditions in various parts of the world.

A recent Consular Report—No. 5135—gives some information regarding the production and export of Chilian Nitrate. The total export of Nitrate from Chilian Ports for each of the last three years was approximately as follows :—

	1910	1911	1912
Tons . . .	5,075,000	5,320,000	5,418,000

The United Kingdom takes about two-fifths, Germany about two-ninths, and the United States about one-fifth of the total quantity exported. In 1909 the average price of nitrate for 95 per cent. f.o.b. was approximately £3 9s. per ton, with the result that many nitrate works found it impossible to produce at the price and in consequence were closed down. Since 1909, however, there has been a steady rise in the price of nitrate, which is now nearly £4 per ton for 95 per cent. f.o.b. As a result several of the works which were closed have been re-opened and some new works have been erected or are in course of construction. It seems probable, however, that present prices will be maintained as the world's consumption of nitrates is steadily increasing year by year.

As a result of the recent examination, at which **Scholarships in Agriculture.** 77 candidates presented themselves, the following have been awarded scholarships in Agriculture, tenable at the Royal College of Science, Dublin :

Boyle, Connel, Dooey House, Lettermacaward, Co. Donegal.

Cassidy, John, Fisherstown, Ballybrittas, Queen's Co.

Duffy, Thomas J., Ballyrush, Inniskeen, Dundalk.

Fagan, Michael J., Barnanstown, Oldtown, Co. Dublin.

Gibson, Thos. J., Creevytenant, Ballynahinch, Co. Down.

Hewitt, James O'N., Crossnacreevy, Castlereagh, Co. Down.

Kelleher, Bart., Stoneview, Blarney, Co. Cork.

Martin, Samuel, Ashside, Cabra, Hillsboro', Co. Down.

Sexton, James, Rath, Dunogan, Miltown-Malbay, Co. Clare.

Sheehy, Morgan, South Lackenduff, Clonakilty, Co. Cork.

Slattery, Denis, Tallow, Co. Waterford.

Treacy, Thadeus, Scariff, Co. Clare.

Woods, Hugh M'F., Blackabbey, Greyabbey, Co. Down.

Eight of the successful candidates had taken out a course of instruction under the Department's scheme of Winter Agricultural Classes. Of these, five supplemented the instruction received at the Winter Classes by a course of training at the Albert Agricultural College, Glasnevin, or at an Agricultural Station. The remaining five successful candidates had also taken out a course of training at the Albert College, Glasnevin, or at an Agricultural Station.

Each scholarship entitles the holder to (1) free admission to the first year's course of instruction at the College, (2) third-class railway fare for one journey to and from the College in each session, and (3) either of the following at the option of the Department: (a) a maintenance allowance of one guinea per week while in attendance at the College, or (b) free board and residence at the Albert Agricultural College, Glasnevin, Dublin, together with a small grant towards the cost of books and apparatus.

A scholarship is tenable for one year, but if satisfactory progress is made, it will be renewed for a second, a third, and for a fourth year, to enable the holder to complete the course at the College.

These scholarships are intended principally to afford the sons of Irish farmers an opportunity for training for County Instructorships or Teacherships under the Department's Agricultural Programme, and special importance is attached to proficiency in practical agriculture.

The Agricultural Faculty at the Royal College of Science was established by the Department in the year 1900. Since then there has been an increasing demand for these scholarships. Already 86 young Irishmen, who have passed successfully through their course in this Faculty have received appointments as County Agricultural Instructors, Teachers, &c.

Scholarships in Horticulture, Forestry and Creamery Management, tenable at the Royal College of Science, are also offered by the Department.

Particulars as to the subjects of examination for these scholarships in 1914 may be obtained from the Registrar, Royal College of Science, Dublin.

STATISTICAL

FISHERY STATISTICS—

STATEMENT of the Total QUANTITY and VALUE of the FISH returned compared with the

—	North Coast.				East Coast.			
	1913.		1912.		1913.		1912.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
Brill,	3	8	1	1	3	7	32	44
Soles,	14	50	11	49	47	241	178	708
Turbot,	—	—	—	—	22	96	68	260
Total Prime Fish, .	17	58	12	50	72	344	278	1,012
Cod,	8	10	5	4	805	803	656	468
Conger Eel,	—	—	—	—	600	439	360	225
Haddock,	16	10	67	29	437	404	557	417
Hake,	—	—	—	—	647	793	745	513
Herrings,	630	158	208	208	65,093	24,669	49,976	13,190
Ling,	—	—	—	—	805	581	602	314
Mackerel,	430	110	29	24	2,421	273	776	168
Plaice,	373	335	363	364	321	319	560	556
Ray or Skate, . . .	8	7	40	10	511	369	530	335
Sprats,	—	—	—	—	—	—	—	—
Whiting,	—	—	—	—	437	406	522	440
All other except Shell Fish	319	142	292	131	802	706	1,034	511
Total,	1,801	830	1,016	820	72,951	30,106	56,596	18,148
SHELL FISH :—	No.		No.		No.		No.	
Crabs,	17,856	58	12,600	26	20,036	95	6,486	34
Lobsters,	15,024	446	13,242	365	11,688	396	14,474	487
Mussels,	—	—	—	—	50	5	—	—
Oysters,	—	—	—	—	—	—	—	—
Other Shell Fish, .	71	11	11	2	467	183	464	153
Total,	—	515	—	393	—	679	—	654
Total value of Fish landed	—	1,345	—	1,213	—	30,785	—	18,802

NOTE.—The above figures are subject

TABLES:

IRELAND.

as landed on the IRISH COASTS during the month of July, 1913, as corresponding period in 1912.

South Coast.				West Coast.				Total.			
1913.		1912.		1913.		1912.		1913.		1912.	
Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
3	8	3	5	26	63	17	33	35	86	53	83
56	252	59	252	104	425	82	340	221	968	330	1,349
1	4	11	42	37	130	26	114	60	230	105	416
60	264	73	299	167	618	125	487	316	1,284	488	1,848
73	53	19	14	—	—	—	—	886	866	680	484
11	4	13	4	—	—	—	—	611	443	373	229
4	3	9	10	63	31	61	40	520	448	694	496
—	—	—	—	11	4	—	—	658	797	745	513
1,368	582	1,935	649	471	209	272	111	67,562	25,618	52,391	14,158
52	37	29	14	—	—	—	—	857	618	631	328
2,585	602	685	230	3,629	826	1,806	463	9,065	1,811	3,296	886
278	328	185	211	216	227	179	161	1,188	1,209	1,287	1,292
—	—	5	1	6	1	—	—	525	377	575	346
—	—	—	—	—	—	—	—	—	—	—	—
6	7	78	29	154	66	70	27	597	479	670	496
457	147	319	166	687	325	956	438	2,265	1,320	2,601	1,246
4,894	2,027	3,350	1,627	5,404	2,307	3,469	1,727	85,050	35,270	64,431	22,322
No.	—	No.	—	No.	—	No.	—	No.	—	No.	—
9,186	122	3,696	33	—	—	—	—	47,078	275	22,782	93
59,517	2,229	30,815	1,137	92,494	3,318	66,913	2,120	178,723	6,389	125,444	4,089
Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—
—	—	—	—	48	3	—	—	98	8	—	—
No.	—	No.	—	No.	—	No.	—	No.	—	No.	—
—	—	—	—	—	—	—	—	—	—	—	—
Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—
140	14	219	63	258	41	226	38	936	249	920	256
—	2,365	—	1,233	—	3,362	—	2,158	—	6,921	—	4,438
—	4,392	—	2,860	—	5,669	—	3,885	—	42,191	—	26,760

to correction in Annual Returns.

FISHERY STATISTICS—

STATEMENT of the Total QUANTITY and VALUE of the FISH returned
compared with the

—	North Coast.				East Coast.			
	1913.		1912.		1913.		1912.	
	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value
	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
Brill,	2	4	1	1	12	30	18	30
Sole,	12	46	10	47	46	184	118	318
Turbot,	4	12	—	—	22	109	44	95
Total Prime Fish, .	18	62	11	48	80	323	180	443
Cod,	7	8	6	3	533	536	638	453
Conger Eel,	—	—	—	—	415	328	442	268
Haddock,	6	4	6	3	279	250	642	468
Hake,	—	—	—	—	426	532	808	538
Herrings,	1,095	559	170	71	61,736	26,096	78,114	21,907
Ling,	—	—	—	—	531	434	616	315
Mackerel	101	21	44	71	1,677	210	1,830	212
Plaice,	382	350	473	502	290	307	643	637
Ray or Skate, . . .	3	3	4	3	381	293	502	343
Sprats,	—	—	—	—	—	—	—	—
Whiting,	—	—	—	—	279	236	499	451
All other except Shell Fish	220	102	44	15	688	607	952	499
Total,	1,832	1,109	758	716	67,315	30,152	85,866	26,534
SHELL FISH :— . . .	No.		No.		No.		No.	
Crabs,	15,864	40	18,678	64	13,470	71	13,500	95
Lobsters,	24,496	718	25,816	754	14,025	511	12,928	399
	Cwts.		Cwts.		Cwts.		Cwts.	
Mussels,	—	—	—	—	—	—	184	32
	No.		No.		No.		No.	
Oysters,	—	—	—	—	—	—	—	—
	Cwts.		Cwts.		Cwts.		Cwts.	
Other Shell Fish, .	103	15	—	—	380	162	249	110
Total,	—	773	—	818	—	744	—	636
Total value of Fish landed	—	1,882	—	1,534	—	30,896	—	27,170

NOTE.—The above figures are subject

IRELAND.

as Landed on the Irish Coasts during the month of August, 1913, as corresponding period in 1912.

South Coast.				West Coast.				Total.			
1913.		1912.		1913.		1912.		1913.		1912.	
Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.
Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
2	5	4	8	7	15	32	56	23	54	55	95
41	158	60	241	73	277	109	419	172	665	297	1,025
—	—	11	55	30	106	43	168	56	227	98	318
43	163	75	304	110	398	184	643	251	916	450	1,438
25	12	17	11	—	—	—	—	565	556	661	467
19	6	—	—	—	—	—	—	434	334	442	268
—	—	12	18	63	35	189	79	348	289	849	568
—	—	37	37	—	—	—	—	426	532	845	575
627	191	1,374	360	1,015	502	1,315	487	64,473	27,348	80,973	22,825
66	33	18	12	—	—	—	—	597	467	634	327
310	127	1,673	357	993	280	901	334	3,081	638	4,448	974
255	289	266	317	87	89	163	151	1,014	1,035	1,545	1,607
—	—	79	28	—	—	—	—	384	296	585	374
371	37	—	—	—	—	—	—	371	37	—	—
—	—	137	46	142	57	434	114	421	293	1,070	611
304	168	391	167	463	278	613	312	1,675	1,155	2,000	993
2,020	1,026	4,079	1,557	2,873	1,639	3,799	2,120	74,040	33,926	94,502	31,027
No.		No.		No.		No.		No.		No.	
3,968	33	2,314	23	—	—	—	—	33,302	144	34,582	182
53,861	1,846	33,870	1,257	75,436	2,713	43,163	1,433	167,818	5,788	115,777	3,843
Cwts.		Cwts.		Cwts.		Cwts.		Cwts.		Cwts.	
—	—	—	—	222	13	592	52	222	13	776	84
No.		No.		No.		No.		No.		No.	
—	—	—	—	—	—	—	—	—	—	—	—
Cwts.		Cwts.		Cwts.		Cwts.		Cwts.		Cwts.	
160	16	224	42	146	26	326	66	789	219	799	218
—	1,895	—	1,322	—	2,752	—	1,551	—	6,164	—	4,327
—	2,921	—	2,979	—	4,391	—	3,671	—	40,090	—	35,354

to correction in Annual Returns.

FISHERY STATISTICS—

STATEMENT of the Total QUANTITY and VALUE of the FISH returned
compared with the

—	North Coast.				East Coast.			
	1913.		1912.		1913.		1912.	
	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.
	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
Brill,	2	3	1	2	3	7	28	41
Soles,	5	25	9	39	27	120	131	558
Turbot,	1	2	1	3	15	71	60	172
Total Prime Fish, .	8	30	11	44	45	198	219	771
Cod,	22	20	26	20	249	259	641	461
Conger Eel,	—	—	—	—	143	129	366	234
Haddock,	—	—	—	—	106	114	432	376
Hake,	—	—	—	—	190	259	694	474
Herrings,	3,159	1,508	6,250	3,302	28,177	11,441	43,252	15,672
Ling,	—	—	—	—	201	169	578	291
Mackerel,	163	31	7	5	377	85	531	62
Plaice,	311	298	278	331	258	283	498	497
Ray or Skate,	84	21	101	25	204	175	531	335
Sprats,	—	—	—	—	—	—	—	—
Whiting,	—	—	—	—	120	118	350	382
All other except Shell Fish	306	139	23	7	441	473	743	373
Total,	4,053	2,047	6,696	3,734	30,511	13,703	48,835	19,928
SHELL FISH :—	No.		No.		No.		No.	
Crabs,	16,428	39	9,360	20	4,522	28	5,452	36
Lobsters,	20,600	621	14,708	444	8,710	314	7,556	229
	Cwts.		Cwts.		Cwts.		Cwts.	
Mussels,	—	—	—	—	446	39	350	28
	No.		No.		No.		No.	
Oysters,	—	—	—	—	3,150	6	1,386	2
	Cwts.		Cwts.		Cwts.		Cwts.	
Other Shell Fish, . .	8	1	71	52	107	45	218	102
Total,	—	661	—	516	—	432	—	397
Total value of Fish landed	—	2,708	—	4,250	—	14,135	—	20,325

NOTE.—The above figures are subject

IRELAND.

as landed on the IRISH COASTS during the month of September, 1913, as corresponding period in 1912.

South Coast.				West Coast.				Total.			
1913.		1912.		1913.		1912.		1913.		1912.	
Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
2	5	4	9	14	32	23	43	21	47	56	95
55	200	66	259	75	292	65	278	162	637	271	1,134
1	2	6	27	26	121	28	126	43	196	95	328
58	207	76	295	115	445	116	447	226	880	422	1,557
22	8	14	10	19	5	4	2	312	292	685	493
17	5	6	2	—	—	—	—	160	134	372	236
—	—	24	34	89	80	271	128	195	194	727	538
2	1	18	19	205	75	64	23	397	335	776	516
1,514	481	1,435	338	4,609	1,875	1,598	716	37,459	15,305	52,535	20,028
11	11	19	9	—	—	—	—	212	180	597	300
3,632	711	14,778	3,134	2,798	982	23,640	5,751	6,970	1,809	38,956	8,952
256	281	190	225	143	119	110	101	968	981	1,076	1,154
—	—	78	27	—	—	60	7	288	196	770	394
4	2	—	—	—	—	—	—	4	2	—	—
—	—	92	36	344	136	450	115	464	254	892	533
365	142	413	152	357	196	881	310	1,469	950	2,060	842
5,881	1,849	17,143	4,281	8,679	3,913	27,194	7,600	49,124	21,512	99,868	35,543
No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
1,202	10	1,026	8	216	1	—	—	22,368	78	15,838	64
21,313	772	29,739	1,110	36,005	1,328	19,307	690	86,628	3,035	71,310	2,473
Cwts.	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.
60	8	—	—	660	44	1,263	87	1,166	91	1,613	115
No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
—	—	—	—	—	—	—	—	3,150	6	1,386	2
Cwts.	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.
300	30	252	36	236	38	175	36	651	114	716	226
—	820	—	1,154	—	1,411	—	813	—	3,324	—	2,880
—	2,669	—	5,435	—	5,324	—	8,413	—	24,836	—	38,423

to correction in Annual Returns.

STATEMENT of the TOTAL QUANTITY of FISH landed on the ENGLISH and WELSH COASTS during the Month and Nine Months ended 30th September, 1913, compared with the corresponding periods of the Year 1912.

	September		Nine months ended 30th September	
	1913.	1912.	1913.	1912.
QUANTITY.				
	Cwts.	Cwts.	Cwts.	Cwts.
Brill,	1,678	1,499	14,148	13,095
Soles,	5,249	5,604	48,759	54,222
Turbot,	4,713	4,240	46,778	44,115
Prime Fish not separately distinguished,	419	440	2,056	4,269
Total Prime Fish,	12,059	11,783	111,736	115,701
Bream,	13,433	15,220	75,498	75,765
Catfish,	21,960	8,777	144,797	83,593
Coalfish,	33,848	28,928	308,461	305,304
Cod,	166,880	167,567	2,115,107	1,971,722
Conger Eels,	4,054	4,984	39,823	44,748
Dabs,	9,254	8,133	77,177	66,890
Dogfish,	2,798	3,354	32,358	24,498
Dory,	163	166	1,643	1,523
Flounders or Flukes,	587	505	4,769	6,349
Gurnards,	7,817	5,252	75,557	67,901
Haddock,	146,704	190,901	1,221,207	1,506,315
Hake,	57,919	50,074	525,216	612,479
Halibut,	10,125	12,694	90,801	96,920
Latchetts (Tubs),	231	256	1,773	1,223
Lemon Soles,	6,113	5,276	48,371	47,294
Ling,	16,581	15,096	172,987	150,750
Megrim,	6,747	7,487	57,038	68,197
Monks (or Anglers),	2,506	2,722	27,925	28,373
Mullet (Red),	2	10	190	284
Plaice,	61,992	77,427	501,270	644,580
Pollack,	651	827	11,011	12,761
Skates and Rays,	28,837	30,190	271,911	274,828
Torsk,	4,839	3,850	25,005	17,232
Whiting,	42,025	39,320	310,308	291,321
Witches,	1,765	1,084	27,981	24,265
Herrings,	591,439	985,494	1,779,115	1,517,466
Mackerel,	8,566	35,453	279,025	296,097
Mullet (Grey),	37	73	520	428
Pilchards,	14,943	20,227	42,436	65,484
Sprats,	—	—	19,426	14,682
Whitebait,	4	367	4,562	—
Fish not separately distinguished,	31,058	32,370	269,204	5,072
Total,	1,305,985	1,765,867	8,674,208	8,727,784
Shell Fish :—	No.	No.	No.	No.
Crabs,	251,302	176,194	5,285,676	5,469,783
Lobsters,	45,846	53,780	584,047	592,588
Oysters,	3,077,150	3,567,865	17,071,826	21,355,424
Other Shell Fish,	58,858	56,718	384,964	337,169
	Cwts.	Cwts.	Cwts.	Cwts.

NOTE.—The figures for 1913 are subject to correction.

STATEMENT of the TOTAL VALUE of FISH landed on the ENGLISH and WELSH COASTS during the Month and Nine Months ended 30th September, 1913, compared with the corresponding periods of the Year 1912.

	September		Nine months ended 30th September	
	1913.	1912.	1913.	1912.
	VALUE.			
	£	£	£	£
Brill,	6,873	6,649	51,128	45,885
Soles,	37,898	41,076	341,119	348,248
Turbot,	21,673	23,604	205,082	196,686
Prime Fish not separately distinguished,	635	643	3,183	6,431
Total Prime Fish,	67,007	71,972	600,512	597,250
Bream,	2,025	2,563	19,976	16,685
Catfish,	10,032	3,675	51,731	32,419
Coalfish,	12,059	8,032	92,231	78,403
Cod,	118,034	101,307	1,271,591	1,057,831
Conger Eels,	2,948	3,358	28,617	29,032
Dabs,	7,282	5,942	72,453	51,917
Dogfish,	822	1,016	11,969	6,985
Dory,	181	151	1,627	1,439
Flounders or Flukes,	631	413	3,685	3,703
Gurnards,	2,508	1,359	23,778	20,039
Haddock,	115,926	114,366	1,002,683	967,312
Hake,	74,212	51,227	524,771	472,249
Halibut,	31,877	36,186	288,901	282,938
Latchets (Tubs),	109	131	928	608
Lemon Soles,	16,391	12,773	125,442	107,315
Ling,	8,726	7,040	83,560	68,456
Megrims,	4,745	5,054	47,722	47,800
Monks (or Anglers),	1,264	1,160	15,423	12,480
Mullet (Red)	8	47	632	741
Plaice,	95,217	97,798	739,862	786,149
Pollack,	406	415	7,290	7,365
Skates and Rays,	21,321	17,705	191,018	170,330
Torsk,	1,728	1,175	9,563	5,750
Whiting,	22,123	17,542	202,685	153,222
Witches,	1,965	1,233	35,958	27,570
Herrings,	261,874	386,247	739,115	594,945
Mackerel,	5,093	12,008	132,891	148,683
Mullet (Grey),	109	146	1,253	898
Pilchards,	6,648	7,916	17,530	26,955
Sprats,	—	—	4,397	2,897
Whitebait	8	785	10,288	10,669
Fish not separately distinguished,	13,087	17,972	158,146	167,837
Total,	906,396	988,684	6,518,208	5,959,372
Shell Fish :—				
Crabs,	3,199	3,018	57,740	56,689
Lobsters,	2,414	2,706	28,187	28,093
Oysters,	11,111	12,399	52,337	66,590
Other Shell Fish,	15,113	14,137	102,653	90,318
Total,	31,837	32,260	240,917	241,690
Total value of all Fish,	938,233	1,020,944	6,759,125	6,201,062

NOTE.—The figures for 1913 are subject to correction.

STATEMENT of the TOTAL QUANTITY of the FISH landed on the SCOTTISH COASTS during the Month and Nine Months ended 30th September, 1913, compared with the corresponding periods of the year 1912.

	September		Nine Months ended 30th September	
	1913	1912	1913	1912
	Quantity			
	Cwts.	Cwts.	Cwts.	Cwts.
Herrings	189,977	114,506	4,327,225	5,129,418
Sprats	69	30	2,648	1,616
Sparlings	66	64	136	226
Mackerel	4,381	6,382	67,364	44,539
Cod	42,003	40,495	731,011	754,858
Codling	18,535	14,452	176,061	157,819
Ling	1,206	817	15,133	14,154
Torsk (Tusk)	14,833	10,974	258,157	187,480
Saith (Coal Fish)				
Haddocks, Extra Large				
Do. Large	55,080	66,882	499,348	42,670
Do. Medium				
Do. Small				
Whittings	18,385	14,175	147,265	127,815
Conger Eels	599	128	20,306	35,098
Gurnards	729	1,436	4,303	6,460
Catfish	1,118	1,144	23,020	24,402
Monks (Anglers)	2,205	2,306	16,407	16,111
Hake	1,056	2,434	8,096	12,837
Squids	—	1	9	114
Turbot	316	365	2,820	3,363
Halibut	5,637	4,874	40,345	40,739
Lemon Soles	3,765	4,192	28,477	32,711
Flounders	938	1,063	6,597	7,378
Plaice, Large				
Do. Medium	4,401	4,208	31,201	37,353
Do. Small				
Brill	17	6	117	181
Dabs	766	1,181	6,426	7,504
Witches	2,429	1,675	18,633	11,170
Megrims	1,189	1,552	12,067	13,196
Skates and Rays	9,670	7,323	108,912	122,524
Unclassified Kinds	838	1,069	10,963	4,411
Total	380,208	303,734	6,563,052	7,436,207
Shell Fish :—	No.	No.	No.	No.
Crabs	128,427	110,102	1,979,285	1,872,178
Lobsters	95,354	72,893	489,998	488,452
Oysters	125,084	132,120	868,344	719,551
Clams	Cwts. 316	Cwts. 356	Cwts. 7,339	Cwts. 6,468
Mussels	6,735	8,095	51,426	61,442
Unclassified	2,695	2,866	32,592	33,246

NOTE.—The above figures are subject to correction in the Annual Returns.

Statement of the TOTAL VALUE of the FISH landed on the SCOTTISH COASTS during the Month and Nine Months ended 30th September, 1913, compared with the corresponding periods of the year 1912.

	September		Nine Months ended 30th September	
	1913	1912	1913	1912
	Value			
	£	£	£	£
Herrings	90,067	45,648	2,029,988	1,841,257
Sprats	23	9	458	269
Sparling	213	146	441	538
Mackerel	773	1,276	8,437	7,546
Cod				
Codling	27,902	25,185	351,689	315,918
Ling	7,176	4,723	64,361	48,901
Torsk (Tusk)	499	366	5,308	3,924
Saith (Coal Fish)	3,022	1,892	38,519	24,539
Haddocks, Extra Large				
Do. Large	41,492	43,189	375,206	381,908
Do. Medium				
Do. Small				
Whittings	6,935	5,650	63,055	49,086
Conger Eels	304	97	9,115	10,821
Gurnards	91	233	668	1,122
Catfish	412	387	6,134	6,589
Monks (Anglers)	504	527	4,431	3,415
Hake	697	1,418	5,523	5,934
Squids	—	—	—	50
Turbot	1,109	1,443	9,447	11,170
Halibut	13,319	11,126	89,833	86,156
Lemon Soles	8,970	8,694	63,129	64,753
Flounders	555	547	4,118	4,067
Plaice, Large				
Do. Medium	7,049	6,071	49,501	51,444
Do. Small				
Brill	37	20	250	396
Dabs	317	435	2,508	2,662
Witches	2,237	1,592	18,827	11,308
Megrimms	1,635	1,651	15,335	13,840
Skates and Rays	2,158	1,867	28,304	31,348
Unclassified kinds	129	177	1,372	873
Total	217,683	164,369	3,245,957	2,979,834
Shell Fish :—				
Crabs	908	807	12,941	12,269
Lobsters	4,582	3,924	25,461	24,643
Oysters	456	466	3,089	2,509
Clams	47	53	960	964
Mussels	359	443	2,876	3,303
Unclassified	948	775	8,951	8,611
Total	7,300	6,468	54,278	52,299
Total Value of all Fish	224,983	170,837	3,300,235	3,032,133

NOTE.—The above figures are subject to correction in the Annual Returns.

STATEMENT of the TOTAL QUANTITY and VALUE of the FISH returned as landed on the IRISH COASTS during the Month and Nine Months ended 30th September, 1913, compared with the corresponding periods of the Year 1912.

	September.		Nine Months ended 30th September.	
	1913.	1912.	1913.	1912.
QUANTITY.				
Brill,	Cwts. 21	Cwts. 58	Cwts. 355	Cwts. 445
Soles,	162	271	1,686	2,444
Turbot,	43	95	449	722
Total Prime Fish,	226	422	2,490	3,611
Cod,	312	685	17,498	26,038
Conger Eel,	160	372	4,830	4,719
Haddock,	195	727	9,509	12,811
Hake,	397	776	5,052	7,102
Herrings,	37,459	52,535	366,839	394,918
Ling,	212	597	7,054	8,073
Mackerel,	6,870	38,956	84,013	150,555
Plaice,	968	1,076	8,767	9,367
Ray or Skate,	288	770	5,872	7,235
Sprats,	4	—	391	58
Whiting,	464	892	6,456	9,383
Fish not separately distinguished, except Shell Fish,	1,469	2,060	14,198	20,013
Total,	49,124	99,868	532,969	653,883
Shell Fish :—	No.	No.	No.	No.
Crabs,	22,368	15,838	187,664	265,149
Lobsters,	86,628	71,310	540,747	484,097
Oysters,	3,150	1,386	79,720	194,529
Mussels,	Cwts. 1,166	Cwts. 1,613	Cwts. 7,436	Cwts. 3,213
Other Shell Fish,	651	716	11,045	11,737
VALUE.				
Brill,	£ 47	£ 95	£ 872	£ 808
Soles,	637	1,134	7,505	10,471
Turbot,	196	328	1,975	2,770
Total Prime Fish,	880	1,557	10,352	14,049
Cod,	292	493	13,764	14,426
Conger Eel,	134	236	3,658	2,773
Haddock,	194	538	6,236	8,501
Hake,	335	516	6,154	5,333
Herrings,	15,305	20,028	139,429	107,026
Ling,	180	300	5,345	4,122
Mackerel,	1,809	8,952	24,819	39,817
Plaice,	981	1,154	8,815	9,295
Ray or Skate,	196	394	3,049	3,734
Sprats,	2	—	43	12
Whiting,	254	533	4,894	6,340
Fish not separately distinguished, except Shell Fish,	950	842	9,160	8,368
Total,	21,512	35,543	235,716	223,796
Shell Fish :—	£	£	£	£
Crabs,	78	64	1,016	1,383
Lobsters,	3,035	2,473	19,595	16,510
Oysters,	6	2	151	293
Mussels,	91	115	1,057	342
Other Shell Fish,	114	226	2,730	3,286
Total,	3,324	2,880	24,549	21,814
Total Value of Fish landed,	24,836	38,423	260,265	245,610

NOTE.—The above figures are subject to correction in the Annual Returns.

QUARTERLY AVERAGE PRICES OF CROPS, LIVE STOCK, MEAT, PROVISIONS, &C.,
for the period ended 30th September, 1913

PRODUCT.	PROVINCE.				IRELAND.	
	Leinster.	Munster.	Ulster.	Con-naught.	1913.	1912.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
CROPS :—						
Wheat, . . . per 112 lbs.	7 7½	8 0	—	—	7 9½	8 0
Oats (White) . . . "	6 8	6 1½	6 10½	7 5½	6 6	7 6½
(Black) . . . "	6 7½	5 7	—	—	5 7½	6 4½
Barley, . . . "	—	7 8½	—	—	7 8½	7 7½
Potatoes . . . "	4 10½	4 3½	3 8½	4 4	4 2½	3 6½
Hay (Clover) . . . "	3 11	2 6	3 1½	2 10	2 10½	3 0½
Hay (Meadow) . . . "	2 8½	2 0	—	1 10½	2 3	2 4½
Grass Seed—						
(Perennial Rye) . . . "	—	—	10 7½	—	10 7½	11 10
(Italian Rye) . . . "	—	—	13 7½	—	13 7½	16 7
Flax . . . per 14 lbs.	—	—	6 8½	—	6 8½	8 6½
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
LIVE STOCK :—						
Calves (young) . . . per head	2 8 0	2 9 5	1 17 3	3 0 3	2 9 4	2 4 1
Store Cattle—						
Over 6 and not exceeding						
12 months . . . per head	5 13 4	4 10 6	5 8 1	5 9 7	5 2 2	3 19 10
One year old and under two						
years . . . per head	8 18 3	7 8 9	8 8 7	8 16 10	8 4 0	7 4 1
Two years old and under						
three years . . . per head	12 3 1	9 15 0	11 3 6	11 19 5	11 1 10	9 16 4
Three years old and over ..	14 2 5	9 3 4	12 4 4	14 10 7	11 2 1	9 19 2
Fat Cattle—						
Two years old and under						
three years . . . per head	15 1 8	15 1 10	14 19 2	14 16 3	15 0 5	13 9 0
Three years old and over ..	17 6 5	15 16 1	17 13 5	16 18 7	15 19 0	15 19 0
Cows and Bulls . . . per head	14 7 1	12 17 9	12 16 6	12 15 6	13 1 4	11 15 5
Springers—						
Cows and Heifers . . . per head	16 3 0	13 14 0	15 13 5	15 16 8	15 7 6	13 11 0
Milch Cows (down calved) ..	14 12 1	13 5 5	14 0 6	14 2 6	14 2 10	12 13 11
Lambs (under 12 months old)						
. . . per head	1 6 8	1 6 3	1 2 11	1 6 0	1 6 0	1 2 1
Store Sheep—						
One year old and under two						
years . . . per head	1 13 0	1 7 0	1 6 7	1 15 11	1 10 8	1 6 8
Two years old and over ..	1 14 0	0 19 5	1 3 8	2 2 7	1 15 10	1 7 4
Fat Sheep—						
One year old and under two						
years . . . per head	2 1 11	2 2 6	2 3 6	2 3 10	2 2 5	1 18 5
Two years old and over ..	2 2 9	1 16 4	2 3 1	2 12 2	2 2 7	1 16 9
Young Pigs—						
8 to 10 weeks old . . . "	1 5 10	1 11 9	1 15 7	1 12 8	1 12 5	1 3 1
Store Pigs—						
10 weeks to 4 months old ..	1 18 2	1 12 5	3 5 10	—	1 16 3	1 8 11
4 months old and over ..	2 7 10	2 2 5	—	—	2 3 5	1 15 4
Fat Pigs "	5 1 8	4 9 11	—	5 15 0	5 1 10	4 5 4
Sows, "	4 10 0	7 15 9	6 14 8	7 14 5	6 18 4	5 7 2
MEAT, PROVISIONS, &C.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Beef (Live) . . . per 112 lbs.	—	—	—	—	35 3	*31 0
(Dead) "	—	—	—	—	61 8	*54 3
Mutton (Live) . . . "	—	—	—	—	36 0	*28 10
(Dead) "	—	—	—	—	63 0	*50 6
Pork (Dead) "	65 4	66 10	66 8	65 5	66 9	59 8
Butter (Creamery) . . . "	110 6	106 9	—	—	107 0	112 4
" (Factory) "	91 9	93 4	—	—	93 3	95 9
" (Farmers') "	91 6	90 0	92 2	93 8	90 4	96 5
Eggs per " 120	10 3½	9 1½	—	9 2	9 8½	9 4½
Wool per lb.	0 11½	1 0½	—	0 11½	0 11½	0 10½

* These figures are calculated from returns as received from 19th to 30th September, 1912, only.

WEEKLY AVERAGE PRICES of WHEAT, OATS, and BARLEY, per 112 lbs., computed from Market Returns of certain quantities of these Cereals supplied by Officers of Customs and Excise, during the QUARTER ended 30th September, 1913.

Returns received in the Week ended	WHEAT.		OATS.		BARLEY.	
	Average Price per 112 lbs.	Quantity.	Average Price per 112 lbs.	Quantity.	Average Price per 112 lbs.	Quantity
		Cwts. of 112 lbs.		Cwts. of 112 lbs.		Cwts. of 112 lbs.
1913.	s. d.		s. d.		s. d.	
July 5	—	—	6 11½	1,372	—	—
" 12	—	—	6 11½	1,686	—	—
" 19	—	—	6 11½	1,884	—	—
" 26	—	—	7 0	1,357	—	—
August 2	—	—	7 0½	1,225	—	—
" 9	—	—	6 10½	1,470	—	—
" 16	—	—	6 10	1,902	—	—
" 23	—	—	6 6½	2,428	—	—
" 30	—	—	6 0½	3,740	7 9	1,080
September 6	—	—	5 11½	13,360	7 9	4,470
" 13	7 7½	250	5 8	23,363	7 9	3,460
" 20	7 10½	1,455	5 9½	27,679	7 9	990
" 27	7 8½	818	5 8½	24,720	7 6½	2,006

QUARTERLY AVERAGE PRICES of FAT CATTLE and FAT SHEEP, per 112 lbs., LIVE WEIGHT, sold in DUBLIN MARKETS during the period ended 30th September, 1913, and also for the corresponding period during sixteen preceding years.

Year.	Fat Cattle.	Fat Sheep.	Year.
	£ s. d.	£ s. d.	
1913,	1 15 3	1 16 0	1913.
1912,	*1 11 0	*1 8 10	1912.
1911,	1 12 7	1 11 7	1911.
1910,	1 15 5	1 13 6	1910.
1909,	1 13 4	1 10 0	1909.
1908,	1 12 4	1 15 8	1908.
1907,	1 11 8	1 18 5	1907.
1906,	1 10 3	1 17 8	1906.
1905,	1 10 6	1 15 1	1905.
1904,	1 11 7	1 15 10	1904.
1903,	1 11 10	1 13 1	1903.
1902,	1 13 10	1 12 1	1902.
1901,	1 11 6	1 12 0	1901.
1900,	1 12 7	1 14 5	1900.
1899,	1 11 0	1 13 2	1899.
1898,	1 9 0	1 11 4	1898.
1897,	1 9 11	1 12 10	1897.

*These figures are calculated from returns as received from 19th to 30th September, 1912, only.

NUMBER OF ANIMALS included in Returns furnished under the MARKERS and FAIRS (Weighing of Cattle) ACT, 1891, Sections 3 and 4,
during the Quarter ended 30th September, 1913.

WEEK ENDED	FAT CATTLE.					FAT SHEEP.			
	Dublin.		Belfast.		Total Number of Cattle included in Returns.	Dublin.		Belfast.	Total Number of Sheep included in Returns.
	Corporation Market Authorities.	Mr. Gavin Low, Auctioneer.	Corporation Market Authorities.	Mr. John Robson, Auctioneer.		Corporation Market Authorities.	Mr. Gavin Low, Auctioneer.	Corporation Market Authorities.	
1913.									
July 3 .	77	124	62	42	305	—	225	—	225
" 10 .	74	224	65	37	400	—	307	—	307
" 17 .	87	201	65	45	398	—	306	—	306
" 24 .	68	183	69	46	366	—	242	—	242
" 31 .	108	192	69	59	428	—	321	—	321
August 7 .	79	148	64	52	343	—	287	—	287
" 14 .	62	168	64	71	365	—	246	—	246
" 21 .	91	178	66	46	381	—	204	—	204
" 28 .	86	148	71	27	332	—	186	—	186
September 4 .	95	170	70	96	431	—	253	—	253
" 11 .	91	143	69	90	393	—	178	—	178
" 18 .	76	95	66	102	339	—	110	—	110
" 25 .	104	97	63	88	352	—	124	—	124
Totals, .	1,098	2,071	863	801	4,833	—	2,989	—	2,989

BUTTER PRICES DURING THE QUARTER

ABSTRACTED FROM "THE GROCER," "GROCER'S REVIEW,"

Excepting 1-lb. Rolls and Farmers' Butter all quotations are the
 an Irish Creamery would be 5s. to 7s. per cwt. less than
 freight, commission,

COUNTRY OF ORIGIN.	Type of Package.	Place of Sale.	WEEK ENDED			
			JULY			
			5th.	12th.	19th.	26th.
IRELAND— Creamery Butter.	Klels, kegs, or pyramid boxes	London, .	108-114	108-112	108-112	108-112
		Liverpool, .	108-112	107-110	105-110	105-110
		Bristol, .	116-117	112-117	112-116	110-114
		Cardiff, .	113-116	113-115	111-114	111-113
		Manchester, .	108-114	110-115	109-114	108-114
		Birmingham, .	112-114	112-114	112-114	110-113
		Glasgow, .	110-112	110-111	109-110	109-110
		Limerick, .	—	—	—	—
		Cork, .	—	—	—	—
		Belfast, .	—	—	—	—
	1lb. rolls, in boxes, Salted or Unsalted.	Dublin, .	110-112	110-112	110-112	110-112
		F.O.R., .	112-121/4	112-121/4	112-121/4	112-121/4
	Factories.	London, .	96-106	96-105	95-104	93-102
		Liverpool, .	96-102	96-102	94-100	94-100
		Bristol, .	100-102	98-104	96-104	96-104
		Cardiff, .	100-104	95-103	96-102	98-104
Farmers' Butter,	Firkins 1st. Export Price	Manchester, .	—	—	—	—
		Cork, .	93-95	93	93-94	93
		Do. 2nd, .	—	—	—	—
		Do. 3rd, .	—	—	—	—
		Fresh, .	—	—	—	—
FRANCE,	12x2 lb. rolls,	London, .	Per doz. lbs. 10/6-13	Per doz. lbs. 10/6-13	Per doz. lbs. 10/6-13/-	Per doz. lbs. 10/6-13/-
	Paris baskets,	do., .	Per cwt. 102-112	Per cwt. 102-112	Per cwt. 102-112	Per cwt. 102-112
DENMARK AND SWEDEN.	Klels, .	Copenhagen Quotation.	102 } Kr. 114/- per 50 cwt. (Kilos)	102 } Kr. 114/- per 50 cwt. (Kilos)	102 } Kr. 114/- per 50 cwt. (Kilos)	102 } Kr. 114/- per 50 cwt. (Kilos)
		Average over-price	—	—	—	—
		London, .	120-122	120-122	120-122	120-122
		Liverpool, .	120-123	120-123	121-124	121-124
		Bristol, .	—	—	—	—
		Cardiff, .	127	128	128	128
		Manchester, .	118-124	119-124	119-124	119-124
		Birmingham, .	122-124	123-125	123-125	123-125
		Newcastle-on-Tyne, .	118-120	118-120	119-122	120-122
		Glasgow, .	122-123	121-122	123-124	123-124
	1lb. rolls, 10x24 lb. boxes.	Leith, .	121-122	120/6-121/6	120/6	121/6
		Hull, .	118-120	121-123	119-121	120-121
		F.O.R. London, .	—	—	—	—
FINLAND,	Klels, .	Manchester, .	110-117	112-118	112-118	112-118
		Liverpool, .	—	—	—	—
		Hull, .	108-110	108-110	108-110	108-110
		Cardiff, .	—	—	—	—

ENDED 30TH SEPTEMBER, 1913.

"GROCER'S GAZETTE," AND OTHER TRADE REPORTS.

Landed Prices of the Choicest Qualities. The Nett F.O.R. Price to the Landed Prices in Great Britain. This figure covers handling, &c.

WEEK ENDED								
AUGUST.					SEPTEMBER.			
2nd.	9th.	16th.	23rd.	30th.	6th.	13th.	20th.	27th.
Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.
106-110	106-110	106-110	106-112	108-114	110-116	114-120	118-124	120-126
104-109	103-109	106-110	108-112	108-113	108-117	116-120	116-124	122-126
108-113	108-113	108-114	112-116	112-116	112-118	116-120	126-127	124-129
108-115	111-115	110-114	113-116	112-116	115-117	116-121	121-125	116-130
107-112	107-112	108-114	110-116	110-116	112-118	116-122	118-126	120-128
110-112	109-111	110-112	112-114	113-114	113-115	118-120	122-124	125-129
108-109	108-109	109-110	111-112	111-112	112-114	117-119	120-122	122-124
—	—	—	—	—	—	—	—	—
109-112	109-112	109-112	109-112	110-114	112-116	114-120	118-121/4	121/4-126
112-121/4	112-121/4	116/8-121/4	116/8-121/4	121/4-126	121/4-126	126-130/8	130/8-135/4	130/8-135/4
90-102	90-102	90-100	90-102	92-102	92-102	92-105	96-108	96-110
94-100	94-100	94-104	94-102	94-102	94-104	98-108	102-108	98-108
96-104	96-104	96-104	96-104	96-104	96-104	96-104	100-104	98-104
96-100	94-100	94-100	93-98	96-100	98-102	95-100	101-106	104-108
93	93	92-93	92	92	92-93	92-93	93-96	96-98
91-92	90	88-90	83-88	83-88	86-90	83-88	90-93	93-97
88	—	85	87	81-84	81-84	81-82	83-84	84-87
93	93	93	93	93	93-94	94-97	97-100	100-106
Per doz. lbs. 10/6-13 Per cwt. 102-112	Per doz. lbs. 10/6-13 Per cwt. 102-112	Per doz. lbs. 10/6-13 Per cwt. 102-112	Per doz. lbs. 10/6-13 Per cwt. 102-112	Per doz. lbs. 10/6-13 Per cwt. 104-112	Per doz. lbs. 10/6-13 Per cwt. 104-112	Per doz. lbs. 11-13/6 Per cwt. 108-117	Per doz. lbs. 11/6-14 Per cwt. 114-121	Per doz. lbs. 11/6-14/6 Per cwt. 116-125
100 Kr. } 111/9 per } 50 } Kilos } —	100 Kr. } 111/9 per } 50 } Kilos } —	102 Kr. } 114/- per } 50 } Kilos } —	102 Kr. } 114/- per } 50 } Kilos } —	102 Kr. } 114/- per } 50 } Kilos } —	106 Kr. } 118/7 per } 50 } Kilos } —	110 Kr. } 123/2 per } 50 } Kilos } —	112 Kr. } 125/6 per } 50 } Kilos } —	112 Kr. } 125/6 per } 50 } Kilos } —
118-120	118-121	120-122	120-122	120-122	125-127	130-132	132-134	132-134
120-123	118-122	119-122	118-125	118-124	120/6-128	128-134	126-135	131-137
128	126	125	128	128	128	133	138	140
115-124	116-121	118-124/6	120-125	119-124	119-128	125-130	130-135	132-137
122-124	120-122	121-123	123-125	123-125	123-125	128-130	133-134	135-137
119-120	120-121	120-123	120-122	120-123	121-128	125-134	132-136	134-136
122-123	119-120	120-121	123-124	122-123	122-123	126-128	131-133	133-135
121/6	118	119	122	122	121-122	126/6	132	134/6
119-120	118/6-120	117-124	117-119	114-115	118-127	129-130	128-130	131-133
—	—	—	—	—	—	—	—	—
109-116	110-116	112-116	112-120	110-120	117-124	123-130	126-131	128-133
—	—	114-117	110-119	112-118	113-118	120-127	126-132	128-134
107-109	108-109	106-111	106-108	109-111	118-120	124-126	126-128	131-123

[Continued on pages 186 and 187

BUTTER PRICES DURING THE QUARTER ABSTRACTED FROM "THE GROCER," "GROCER'S REVIEW,"

Excepting 1-lb. Rolls and Farmers' Butter all quotations are the
an Irish Creamery would be 5s. to 7s. per cwt. less than
freight, commission,

COUNTRY OF ORIGIN	Type of Package.	Place of Sale.	WEEK ENDED.			
			JULY			
			5th.	12th.	19th.	26th.
RUSSIA AND SIBERIA.	Kieles.	London.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.
		Liverpool.	98-100	98-100	98-100	98-100
		Bristol.	98-103	98-103	98-103	98-103
		Cardiff.	103-106	98-106	98-106	98-106
		Manchester.	106-108	102-108	104-106	102-106
		Birmingham.	98-104	100-104	100-103	98-104
		Glasgow.	100-106	102-106	102-106	102-106
		Leith.	104-107	104-107	104-107	104-107
		Hull.	100-103	98-103	100-103	100-104
		Hull.	—	102-104	—	—
HOLLAND.	Boxes.	London.	105-108	102-108	100-106	—
	Rolls.	do.	Per doz. lbs. 12/6-13	Per doz. lbs. 12/6-13	Per doz. lbs. 12/6-13	Per doz. lbs. —
	Boxes.	Glasgow.	Per cwt.	Per cwt.	Per cwt.	Per cwt.
		Fresh.	122-123	121-123	122-123	122-123
		Salt.	117-118	116-117	113-118	113-118
		Manchester.	—	—	—	—
		Hull.	114-115	112-114	114-116	112-113
		London.	Per doz. lbs. —	Per doz. lbs. —	Per doz. lbs. —	Per doz. lbs. —
		do.	—	—	—	—
		Glasgow.	—	—	—	—
ITALY.	Rolls.	London.	—	—	—	—
CANADA.	56 lb. boxes.	London.	Per cwt.	Per cwt.	Per cwt.	Per cwt.
		Liverpool.	—	—	—	—
		Bristol.	—	—	—	—
		Cardiff.	—	—	—	—
		Birmingham.	—	—	—	—
		Manchester.	—	—	—	—
		Glasgow.	—	—	—	—
		London.	A.s. 102-108 u. 102-110	A.s. 102-106 u. 102-108	A.s. 102-108 u. 102-108	A.s. 102-106 u. 102-108
		Liverpool.	Z. 114-116	Z. —	Z. —	Z. —
		Bristol.	A. 108-112	A. —	A. —	A. —
AUSTRALIA AND NEW ZEALAND.*	Boxes.	Bristol.	Z. 119-120	Z. —	Z. —	Z. —
		Cardiff.	A. 108-112	A. 102-112	A. 102-110	A. 102-112
		Manchester.	Z. 119-120	Z. 119-122	Z. 119-122	Z. 119-122
		Birmingham.	A. 108-110	A. 104-108	A. —	A. 110
		Glasgow.	Z. 116	Z. —	Z. —	Z. 113
		Leith.	A. —	A. —	A. —	A. —
		Hull.	Z. —	Z. —	Z. —	Z. —
		London.	A. —	A. —	A. —	A. —
		Liverpool.	Z. —	Z. —	Z. —	Z. —
		Bristol.	A. —	A. —	A. —	A. —
ARGENTINA.	Boxes.	Cardiff.	A. —	A. —	A. —	A. —
		Manchester.	Z. —	Z. —	Z. —	Z. —
		Birmingham.	A. —	A. —	A. —	A. —
		Glasgow.	Z. —	Z. —	Z. —	Z. —
		Leith.	A. —	A. —	A. —	A. —
		Hull.	Z. —	Z. —	Z. —	Z. —
		London.	A. —	A. —	A. —	A. —
		Liverpool.	Z. —	Z. —	Z. —	Z. —
		Bristol.	A. —	A. —	A. —	A. —
		Cardiff.	Z. —	Z. —	Z. —	Z. —
UNITED STATES.	Tubs and boxes.	London.	—	—	—	—
		Liverpool.	—	—	—	—
		Bristol.	—	—	—	—
		Cardiff.	—	—	—	—
		Manchester.	—	—	—	—
		London.	—	—	—	—
		Liverpool.	—	—	—	—
		Bristol.	—	—	—	—
		Cardiff.	—	—	—	—
		Manchester.	—	—	—	—

A.—Australia.

Z.—New Zealand.

s.—salted.

u.—unsalted.

TABLES SHOWING THE EXPORTS

TABLE

RETURN of the NUMBER of ANIMALS EXPORTED from IRELAND to GREAT
the PORTS OF EMBARKATION

IRISH PORTS.	CATTLE.							SHEEP.			
	Fat.	Stores (fatten- ing).	Milch Cows.	Spring- ers.	Other Cattle.	Calves.	Total.	Fat.	Stores.	Lambs.	Total.
Ballina,	321	—	—	—	341	—	662	135	—	11,295	11,430
Belfast,	8,467	15,027	1,755	4,148	53	132	29,582	—	2	11,236	11,238
Coleraine,	17	567	1	48	1	—	634	—	—	103	103
Cork,	4,554	18,812	1,223	1,938	129	3,936	30,592	580	3,902	22,668	27,150
Drogheda,	9,936	917	430	65	—	2	11,350	4,932	—	10,298	15,230
Dublin,	59,151	13,773	8,632	881	—	1,578	84,015	43,068	—	83,387	126,453
Dundalk,	2,530	1,237	156	190	—	—	4,113	8,998	—	19,310	28,309
Dundrum,	—	—	—	—	—	—	—	—	—	—	—
Greenore,	630	5,647	816	1,177	—	25	8,295	3,342	246	1,192	4,780
Larne,	89	3,855	—	43	—	6	3,993	746	498	254	1,498
Limerick,	589	135	—	—	294	21	1,039	25	—	58	83
Londonderry,	2,023	12,165	320	1,256	—	1,544	17,308	4,558	5,021	8,918	19,097
Milford,	—	77	1	1	4	—	83	11	—	11	11
Mulroy,	2	88	—	—	—	—	90	116	—	12	128
Newry,	4	709	45	51	—	—	809	2,797	146	8,299	11,242
Portrush,	—	—	—	—	—	—	—	—	—	—	—
Rosslare,	—	—	—	—	—	—	—	—	—	—	—
Sligo,	791	12	—	—	241	47	1,091	575	—	5,073	5,648
Warrenpoint,	—	—	—	—	—	—	—	—	—	—	—
Waterford,	8,319	12,992	99	33	—	1,285	23,723	4,326	—	20,876	25,202
Westport,	126	264	1	4	125	1	521	5,080	—	7,774	12,854
Wexford,	—	—	—	—	—	—	—	—	—	—	—
TOTAL,	97,549	86,277	13,479	9,835	1,188	8,577	216,905	79,287	10,415	210,753	300,455

TABLE

RETURN of the NUMBER of ANIMALS EXPORTED from IRELAND to GREAT
the PORTS OF DEBARKATION

BRITISH PORTS.	CATTLE.							SHEEP.			
	Fat.	Stores (fatten- ing).	Milch Cows.	Spring- ers.	Other Cattle.	Calves.	Total.	Fat.	Stores.	Lambs.	Total.
Ardrossan,	—	—	—	—	—	—	—	—	—	—	—
Ayr,	2,320	11,665	113	677	—	128	14,903	746	39	546	1,331
Barrow,	70	1,399	212	561	—	—	2,242	—	—	—	—
Bristol,	1,375	12,642	305	590	—	935	15,847	513	357	3,403	4,273
Cardiff,	23	633	28	43	—	96	823	—	957	59	1,016
Dover,	—	—	—	—	—	—	—	—	—	—	—
Falmouth,	—	—	—	—	—	—	—	—	—	—	—
Fishguard,	3,695	14,092	758	944	—	3,075	22,564	1,398	2,499	12,257	16,154
Fleetwood,	519	1,384	1,085	1,423	20	—	4,431	—	1	8,873	8,874
Glasgow,	17,338	17,969	1,681	2,784	1,152	2,029	42,953	2,963	260	8,263	11,486
Greenock,	510	1,345	2	11	12	—	1,380	—	—	—	—
Heysham,	3,889	4,045	1,828	251	—	50	10,063	1,023	3,984	880	5,837
Holyhead,	13,569	13,381	2,377	1,551	—	1,125	32,003	10,584	246	20,020	30,850
Liverpool,	45,261	7,583	4,894	987	4	1,139	59,868	51,946	1,612	144,586	198,144
London,	—	—	—	—	—	—	—	—	—	—	—
Manchester,	8,980	31	196	13	—	—	9,220	10,114	—	11,866	21,980
Newhaven,	—	—	—	—	—	—	—	—	—	—	—
Plymouth,	—	—	—	—	—	—	—	—	—	—	—
Preston,	—	—	—	—	—	—	—	—	—	—	—
Silloth,	—	—	—	—	—	—	—	—	—	—	—
Southampton,	—	—	—	—	—	—	—	—	—	—	—
Stranraer,	—	108	—	—	—	—	108	—	460	—	460
Whitehaven,	—	—	—	—	—	—	—	—	—	—	—
TOTAL,	97,549	86,277	13,479	9,835	1,188	8,577	216,905	79,287	10,415	210,753	300,455

AND IMPORTS OF ANIMALS.

I.

BRITAIN during the Three Months ended 30TH SEPTEMBER, 1913, showing
IN IRELAND.

SWINE.			Goats.	HORSES.				Mules or Jennets	Asses.	Total Animals	IRISH PORTS.
Fat.	Stores.	Total.		Stal- lions.	Mares.	Geld- ings.	Total.				
414	43	457	2	—	1	—	1	—	—	12,552	Ballina.
871	1,119	1,990	4	5	768	1,304	2,077	4	12	44,907	Belfast.
11	—	11	—	—	2	2	4	—	—	752	Coleraine.
1,675	—	1,675	—	10	278	370	658	—	126	60,201	Cork.
302	146	448	2	1	13	9	23	—	1	27,054	Drogheda.
3,889	139	4,028	5	75	1,827	1,524	3,426	4	21	217,952	Dublin.
2,652	171	2,823	77	—	456	309	765	—	142	36,228	Dundalk.
—	—	—	—	—	—	—	—	—	—	—	Dundrum.
27	87	114	15	1	1,583	1,052	2,636	—	120	15,960	Greennore.
24	86	110	—	7	34	105	146	1	—	5,748	Larne.
1	—	1	—	—	5	9	14	—	1	1,138	Limerick.
253	111	364	4	—	37	39	76	—	3	36,852	Londonderry.
69	—	69	—	—	—	5	5	—	—	168	Millford.
145	—	145	—	—	—	1	1	—	—	364	Mulroy.
85	—	85	—	—	5	6	11	—	17	12,164	Newry.
16	—	16	—	—	4	4	8	—	—	24	Portrush.
—	—	—	—	—	—	—	—	—	—	—	Rosslare.
3,862	63	3,925	—	—	1	1	2	—	2	10,668	Sligo.
2,698	—	2,698	1	13	615	661	1,289	1	55	51,974	Warrenpoint.
84	—	84	2	—	4	1	5	—	—	13,466	Waterford.
—	—	—	—	—	—	—	—	—	—	—	Westport.
—	—	—	—	—	—	—	—	—	—	—	Wexford.
17,078	1,965	19,043	112	112	5,633	5,402	11,147	10	500	548,172	TOTAL.

II.

BRITAIN during the Three Months ended 30TH SEPTEMBER, 1913, showing
IN GREAT BRITAIN.

SWINE.			Goats.	HORSES.				Mules or Jennets	Asses.	Total Animals	BRITISH PORTS.
Fat.	Stores.	Total.		Stal- lions.	Mares.	Geld- ings.	Total.				
—	—	—	—	—	93	275	368	2	23	393	Ardrossan.
410	1,200	1,610	—	3	51	96	150	—	—	17,896	Ayr.
402	—	402	—	—	26	40	66	—	—	2,710	Barrow.
179	—	179	—	—	58	69	127	—	3	20,429	Bristol.
—	—	—	—	—	—	—	—	—	—	1,839	Cardiff.
—	—	—	—	—	1	1	2	—	—	2	Dover.
—	—	—	—	—	—	1	1	—	—	1	Falmouth.
2,315	—	2,315	—	14	723	798	1,535	—	109	42,677	Fishguard.
41	3	44	—	2	314	394	710	—	1	14,060	Fleetwood.
2,316	4	2,320	8	1	174	302	477	2	6	57,252	Glasgow.
—	—	—	—	—	17	12	29	—	—	1,909	Greenock.
342	101	443	—	6	466	547	1,019	—	1	17,413	Heysham.
3,140	226	3,366	19	63	2,771	2,036	4,870	3	121	71,232	Holyhead.
7,933	431	8,364	85	13	815	627	1,455	2	216	268,134	Liverpool.
—	—	—	—	—	1	—	1	—	—	—	London.
—	—	—	—	2	31	25	58	—	17	31,275	Manchester.
—	—	—	—	—	1	13	14	—	—	14	Newhaven.
—	—	—	—	1	16	21	38	—	—	38	Plymouth.
—	—	—	—	—	6	5	11	—	—	11	Preston.
—	—	—	—	—	26	20	46	—	1	47	Sliloth.
—	—	—	—	—	9	15	24	—	—	24	Southampton.
—	—	—	—	7	34	105	146	1	—	715	Stranraer.
—	—	—	—	—	—	—	—	—	—	—	Whitehaven.
17,078	1,965	19,043	112	112	5,633	5,402	11,147	10	500	548,172	TOTAL.

TABLE

RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from GREAT
the PORTS OF

IRISH PORTS.	CATTLE.							SHEEP.			
	Fat	Stores (fatten- ing).	Milch Cows.	Spring- ers.	Other Cattle.	Calves.	Total.	Fat.	Stores.	Lamba.	Total.
Ballina,	—	—	—	—	19	2	21	87	1,078	233	1,398
Belfast,	—	—	—	—	—	—	—	—	—	—	—
Coleraine,	—	—	—	—	—	—	—	—	12	—	12
Cork,	—	7	—	—	—	—	7	—	—	—	—
Drogheda,	—	—	—	—	—	—	—	—	—	—	—
Dublin,	—	12	13	—	—	3	28	79	1,093	54	1,226
Dundalk,	—	—	—	—	—	—	—	—	—	—	—
Dundrum,	—	—	—	—	—	—	—	—	—	—	—
Greenore,	—	—	—	—	—	1	1	—	—	—	—
Larne,	—	3	4	4	—	1	12	—	317	—	317
Limerick,	1	—	—	—	—	—	1	—	—	—	—
Londonderry,	—	9	—	3	—	—	12	—	65	128	193
Milford,	—	—	—	—	—	—	—	—	—	—	—
Mulroy,	—	—	—	—	—	—	—	—	—	—	—
Newry,	—	—	—	—	—	—	—	—	—	—	—
Portrush,	—	—	—	—	—	—	—	—	16	—	16
Rosslare,	—	—	—	—	—	—	—	—	—	—	—
Sligo,	—	—	—	—	—	—	—	—	52	—	52
Warrenpoint,	—	—	—	—	—	—	—	—	—	—	—
Waterford,	—	4	—	2	—	—	6	—	73	—	73
Westport,	—	—	—	—	—	—	—	—	—	—	—
Wexford,	—	—	—	—	—	—	—	—	—	—	—
TOTAL,	1	35	17	9	19	7	88	166	2,706	415	3,287

TABLE

RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from GREAT
the PORTS of EMBARKATION

BRITISH PORTS.	CATTLE.							SHEEP.			
	Fat.	Stores (fatten- ing).	Milch Cows.	Spring- ers.	Other Cattle.	Calves.	Total.	Fat.	Stores.	Lamba.	Total.
Ardrossan,	—	—	—	—	5	—	5	66	43	—	109
Ayr,	—	—	4	4	—	—	8	21	1,280	233	1,534
Barrow,	—	—	—	—	—	—	—	—	—	—	—
Bristol,	—	1	—	—	—	—	1	—	—	—	—
Cardiff,	—	—	—	—	—	—	—	—	—	—	—
Falmouth,	—	—	—	—	—	—	—	—	—	—	—
Fishguard,	—	4	—	—	—	—	4	—	46	—	46
Fleetwood,	—	—	—	—	1	—	1	—	—	—	—
Glasgow,	1	15	1	3	5	3	28	79	1,169	178	1,426
Greenock,	—	2	—	—	—	—	2	—	17	—	17
Heysham,	—	—	—	—	—	—	—	—	25	—	25
Holyhead,	—	8	11	—	—	2	21	—	64	—	64
Liverpool,	—	2	—	—	—	—	2	—	14	4	18
London,	—	—	—	—	—	—	—	—	—	—	—
Manchester,	—	—	—	—	—	—	—	—	—	—	—
Newhaven,	—	—	—	—	—	—	—	—	—	—	—
Plymouth,	—	—	—	—	—	—	—	—	1	—	1
Preston,	—	—	—	—	—	—	—	—	—	—	—
Silloth,	—	—	—	—	—	—	—	—	—	—	—
Southampton,	—	—	1	2	8	1	12	—	—	—	—
St. Ann's,	—	3	—	—	—	1	4	—	47	—	47
Whitehaven,	—	—	—	—	—	—	—	—	—	—	—
TOTAL,	1	35	17	9	19	7	88	166	2,706	415	3,287

III.

BRITAIN during the Three Months ended 30TH SEPTEMBER, 1913, showing
DEBARKATION IN IRELAND.

SWINE.			Goats.	HORSES.				Mules or Jennets	Asses.	Total Animals	IRISH PORTS.
Fat.	Stores.	Total.		Stal- lions.	Mares.	Geld- ings.	Total.				
—	—	—	—	—	—	—	—	—	—	—	Ballina.
—	—	—	—	24	216	98	338	—	—	1,757	Belfast.
—	—	—	—	—	—	1	1	—	—	1	Coleraine.
—	15	15	1	27	61	60	148	—	—	133	Cork.
—	—	—	—	—	—	1	1	—	—	1	Drogheda.
—	10	10	1	92	395	222	709	—	2	1,976	Dublin.
—	—	—	—	—	—	1	1	—	—	1	Dundalk.
—	—	—	—	—	—	—	—	—	—	—	Dundrum.
—	1	1	—	1	87	62	150	—	—	152	Greenore.
—	—	—	—	3	38	6	47	—	—	376	Larne.
—	—	—	—	—	—	—	—	—	—	1	Limerick.
—	—	—	—	4	37	18	59	—	—	264	Londonderry.
—	—	—	—	—	—	—	—	—	—	—	Malford.
—	—	—	—	—	—	1	1	—	—	1	Mulroy.
—	—	—	1	—	1	2	3	—	—	20	Newry.
—	—	—	—	—	—	—	—	—	—	—	Portrush.
—	—	—	—	—	—	1	1	—	—	53	Rosslare.
—	—	—	—	—	—	—	—	—	—	—	Sligo.
—	—	—	1	—	42	64	106	—	—	186	Warrenpoint.
—	—	—	—	—	—	—	—	—	—	—	Waterford.
—	—	—	—	—	—	—	—	—	—	—	Westport.
—	—	—	—	—	—	—	—	—	—	—	Wexford.
—	26	26	4	151	878	536	1,565	—	2	4,972	TOTAL.

IV.

BRITAIN during the Three Months ended 30TH SEPTEMBER, 1913, showing
IN GREAT BRITAIN.

SWINE.			Goats.	HORSES.				Mules or Jennets	Asses.	Total Animals	BRITISH PORTS.
Fat.	Stores.	Total.		Stal- lions.	Mares.	Geld- ings.	Total.				
—	—	—	—	8	56	19	83	—	—	197	Ardrossan.
—	—	—	—	12	126	29	167	—	—	1,709	Ayr.
—	—	—	—	—	—	—	—	—	—	—	Barrow.
—	—	—	1	—	5	6	11	—	—	13	Bristol.
—	—	—	—	—	—	—	—	—	—	—	Cardiff.
—	—	—	—	—	—	1	1	—	—	1	Falmouth.
—	—	—	—	23	70	72	165	—	—	215	Fishguard.
—	—	—	—	—	10	12	22	—	—	23	Fleetwood.
—	1	1	—	1	17	33	51	—	—	1,508	Glasgow.
—	—	—	1	4	35	17	56	—	—	76	Greenock.
—	—	—	—	1	8	15	24	—	—	49	Heysham.
—	5	5	1	88	396	206	690	—	—	782	Holyhead.
—	20	20	—	4	33	27	64	—	1	105	Liverpool.
—	—	—	—	—	—	1	1	—	1	1	London.
—	—	—	—	—	—	30	30	—	—	30	Manchester.
—	—	—	—	—	—	—	—	—	—	—	Newhaven.
—	—	—	1	5	47	51	103	—	—	105	Plymouth.
—	—	—	—	—	—	—	—	—	—	—	Preston.
—	—	—	—	2	37	8	47	—	—	47	Silloth.
—	—	—	—	—	1	3	4	—	—	16	Southampton.
—	—	—	—	3	37	6	46	—	—	97	Stranraer.
—	—	—	—	—	—	—	—	—	—	—	Whitehaven.
—	26	26	4	151	878	536	1,565	—	2	4,972	TOTAL.

RETURN of the NUMBER of ANIMALS EXPORTED from IRELAND to the
showing the PORTS of

IRISH PORTS.	CATTLE.					SHEEP.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.
BELFAST, .	16	163	—	15	194	—	328	328
DUBLIN, .	163	105	—	16	284	102	2 958	3 060
TOTAL, .	179	268	—	31	478	102	3,286	3 388

RETURN of the NUMBER of ANIMALS EXPORTED from IRELAND to the
showing the PORTS of DEBARKATION

ISLE OF MAN PORT.	CATTLE.					SHEEP.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.
DOUGLAS, .	179	268	—	31	478	102	3,286	3,388

RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from the
showing the PORTS of

IRISH PORTS.	CATTLE.					SHEEP.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.
BELFAST, .	—	—	—	—	—	—	—	—
DUBLIN, .	—	—	—	—	—	—	—	—
TOTAL, .	—	—	—	—	—	—	—	—

RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from the
showing the PORTS of EMBARKATION

ISLE OF MAN PORT.	CATTLE					SHEEP.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.
DOUGLAS, .	—	—	—	—	—	—	—	—

ISLE OF MAN during the Three Months ended 30th September, 1913,
EMBARKATION IN IRELAND.

SWINE.			Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	IRISH PORTS.
Fat.	Stores.	Total.		Stallions	Mares.	Geldings	Total.				
—	—	—	—	—	9	27	36	—	—	558	BELFAST. DUBLIN.
—	—	—	—	—	9	3	12	—	—	3,356	
—	—	—	—	—	18	30	48	—	—	3,914	TOTAL

ISLE OF MAN during the Three Months ended 30th September, 1913,
in the ISLE OF MAN.

SWINE.			Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	ISLE OF MAN PORT.
Fat.	Stores.	Total.		Stallions	Mares.	Geldings	Total.				
—	—	—	—	—	18	30	48	—	—	3,914	DOUGLAS.

ISLE OF MAN during the Three Months ended 30th September, 1913,
DEBARKATION IN IRELAND.

SWINE.			Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	IRISH PORTS.
Fat.	Stores.	Total.		Stallions	Mares.	Geldings	Total.				
—	—	—	—	—	3	6	9	—	—	9	BELFAST. DUBLIN.
—	—	—	—	—	1	1	2	—	—	2	
—	—	—	—	—	4	7	11	—	—	11	TOTAL

ISLE OF MAN during the Three Months ended 30th September, 1913,
in the ISLE OF MAN.

SWINE.			Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	ISLE OF MAN PORT.
Fat.	Stores.	Total.		Stallions	Mares.	Geldings	Total.				
—	—	—	—	—	4	7	11	—	—	11	DOUGLAS.

COASTING AND

RETURN OF THE NUMBER OF ANIMALS SHIPPED to and from Places in
the Places of Embarkation

Irish Ports.	CATTLE.					SHEEP.			SWINE.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.	Fat.	Stores.	Total.
Cork to Aghada Pier, .	—	—	—	—	—	—	—	—	—	—	—
" to Belfast, .	—	—	—	—	—	—	—	—	—	—	—
" to Spike Island, .	—	—	—	—	—	—	—	—	—	—	—
" to Queenstown, .	—	—	—	—	—	—	—	—	—	—	—
" to Waterford, .	—	—	—	—	—	—	—	—	—	—	—
Total, .	—	—	—	—	—	—	—	—	—	—	—
Aghada Pier to Cork, .	—	—	—	—	—	—	—	—	—	—	—
Belfast " .	—	—	—	—	—	—	—	—	—	—	—
Spike Island " .	—	—	—	—	—	—	—	—	—	—	—
Queenstown " .	—	—	—	—	—	—	—	—	—	—	—
Waterford " .	—	1	—	—	1	—	—	—	—	—	—
Total, .	—	1	—	—	1	—	—	—	—	—	—
Waterford to Ballyhack, .	—	—	—	—	—	—	—	—	—	—	—
" to Belfast, .	—	4	—	—	4	—	—	—	—	—	—
" to Duncannon .	—	29	—	11	40	—	—	—	—	10	10
Total, .	—	33	—	11	44	—	—	—	—	10	10
Ballyhack to Waterford, .	8	13	—	13	34	60	181	241	25	—	25
Dublin to Belfast, .	576	53	—	2	631	1,125	359	1,484	—	—	—
Duncannon to Waterford, .	25	21	—	—	46	57	11	68	214	—	214
Kilrush to Limerick, .	—	104	—	70	174	—	30	30	1,369	—	1,369
Kildysart " .	—	—	—	—	—	—	—	—	89	—	89
Glin, " .	—	—	—	—	—	—	—	—	—	—	—
Portumna, " .	—	—	—	—	—	—	—	—	68	—	68
Tarbert, " .	—	—	—	—	—	—	—	—	81	—	81
Kilkee, " .	—	—	—	—	—	—	—	—	—	—	—
Total, .	—	104	—	70	174	—	30	30	1,607	—	1,607
Greencastle to Greenore, .	—	—	—	—	—	—	—	—	—	—	—
Belfast to Dublin, .	—	—	—	—	—	16	—	16	—	—	—
Londonderry to Moville, .	—	1	—	—	1	—	—	—	—	—	—
Moville to Londonderry, .	—	147	—	—	147	11	—	11	—	—	—
Ballina to Sligo, .	—	—	—	—	—	—	—	—	—	—	—
Belmullet " .	4	12	18	—	34	—	92	92	1,026	—	1,026
Westport " .	—	—	—	—	—	—	—	—	—	—	—
Total, .	4	12	18	—	34	—	92	92	1,026	—	1,026
Sligo to Belmullet, .	—	1	1	—	2	—	—	—	—	—	—
Milford to Portrush, .	—	—	—	—	—	—	—	—	7	—	7
Sligo to Ballina, .	—	—	1	—	1	—	—	—	—	—	—
Mulroy to Portrush, .	—	—	—	—	—	—	—	—	4	4	8
Leftbeg to Mulroy, .	2	—	—	—	2	—	—	—	—	—	—
Total, .	615	386	20	96	1,117	1,269	673	1,942	2,883	14	2,897

INLAND NAVIGATION.

Ireland during the Three Months ended 30TH SEPTEMBER, 1913, showing and Debarkation.

Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	IRISH PORTS.
	Stallions.	Mares.	Geldings.	Total.				
—	—	—	—	—	—	—	—	Cork to Aghada Pier.
—	—	—	—	—	—	—	—	„ to Belfast.
—	—	—	—	—	—	—	—	„ to Spike Island.
—	—	—	1	1	—	—	1	„ to Queenstown.
—	—	—	—	—	—	—	—	„ to Waterford.
—	—	—	1	1	—	—	1	Total.
—	—	—	—	—	—	—	—	Aghada Pier to Cork.
—	—	—	—	—	—	—	—	Belfast „
—	—	—	—	—	—	—	—	Spike Island „
—	—	—	—	—	—	—	1	Queenstown „
—	—	—	—	—	—	—	—	Waterford „
—	—	—	—	—	—	—	1	Total.
—	—	—	—	—	—	—	—	Waterford to Ballyhack.
—	—	—	—	—	—	—	4	„ to Belfast.
—	—	—	1	1	1	—	52	„ to Duncannon.
—	—	—	1	1	1	—	56	Total.
—	—	—	—	—	—	—	300	Ballyhack to Waterford.
—	—	5	9	14	—	—	2,129	Dublin to Belfast.
—	—	—	—	—	—	—	328	Duncannon to Waterford.
—	—	—	—	—	—	—	1,573	Kilrush to Limerick.
—	—	—	—	—	—	—	89	Kildysart „
—	—	—	—	—	—	—	—	Glin „
—	—	—	—	—	—	—	68	Portumna „
—	—	—	—	—	—	—	81	Tarbert „
—	—	—	—	—	—	—	—	Kilkee „
—	—	—	—	—	—	—	1,811	Total.
—	—	—	—	—	—	—	—	Greencastle to Greenore.
—	—	11	14	25	—	—	41	Belfast to Dublin.
—	—	—	—	—	—	—	1	Londonderry to Moville.
—	—	—	—	—	—	—	158	Moville to Londonderry.
—	—	—	—	—	—	—	—	Ballina to Sligo.
—	—	—	—	—	—	—	1,152	Belmullet „
—	—	—	—	—	—	—	—	Westport „
—	—	—	—	—	—	—	1,152	Total.
—	—	1	—	1	—	—	3	Sligo to Belmullet.
—	—	—	—	—	—	—	7	Milford to Portrush.
—	—	—	—	—	—	—	1	Sligo to Ballina.
—	—	—	—	—	—	—	8	Mulroy to Portrush.
—	—	—	—	—	—	—	2	Leitbeg to Mulroy.
—	—	17	25	42	1	—	5,999	Total

RETURN of the NUMBER of HORSES EXPORTED from IRELAND through GREAT BRITAIN to the COLONIES and FOREIGN COUNTRIES during the THREE MONTHS ended 30TH SEPTEMBER, 1913, showing the Ports of Embarkation in Ireland.

PORTS.	Number of Horses.			
	Stallions.	Mares.	Geldings.	Total.
Belfast,	1	195	224	420
Cork,	—	—	—	—
Dublin,	1	337	241	579
Dundalk,	—	390	211	601
Greenore,	—	941	564	1,505
Waterford,	1	332	240	573
Wexford,	—	—	—	—
Total,	3	2,195	1,480	3,678

RETURN of the NUMBER of HORSES IMPORTED into IRELAND through GREAT BRITAIN from the COLONIES and FOREIGN COUNTRIES during the THREE MONTHS ended 30TH SEPTEMBER, 1913, showing the Ports of Debarkation in Ireland.

PORTS.	Number of Horses.			
	Stallions.	Mares.	Geldings.	Total.
Belfast,	9	69	13	91
Dublin,	3	41	37	81
Wexford,	—	—	—	—
Total,	12	110	50	172

RETURN of the NUMBER of HORSES EXPORTED from IRELAND direct to FOREIGN COUNTRIES during the THREE MONTHS ended 30TH SEPTEMBER, 1913, showing the Ports of Debarkation in Ireland.

PORTS.	Number of Horses.			
	Stallions.	Mares.	Geldings.	Total.
Dublin,	—	—	—	248
Limerick,	—	165	83	
Total,	—	165	83	248

DISEASES OF ANIMALS IN IRELAND.

NUMBER of OUTBREAKS of SWINE FEVER, and NUMBER of SWINE returned as having been SLAUGHTERED in Ireland, under the Diseases of Animals Act of 1894, in the undermentioned period, by Order of the Department.

Quarter ended	SWINE FEVER.	
	Outbreaks confirmed.	Swine Slaughtered as Diseased or as having been Exposed to Infection
30th September, 1913,	31	194

NUMBER of OUTBREAKS reported as having taken place, and NUMBER of ANIMALS returned as having been Attacked by ANTHRAX and GLANDERS in Ireland in the undermentioned period.

Quarter ended	ANTHRAX.		GLANDERS (including Farcy).		Foot and Mouth Disease	
	Outbreaks Reported	Animals Attacked	Outbreaks Reported.	Animals Attacked.	Outbreaks Reported.	Animals Attacked.
30th Sept., 1913,	—	—	—	—	—	—

NUMBER of CASES of RABIES in DOGS in IRELAND during the undermentioned period.

Quarter ended	Number of Cases.
30th September, 1913,	—

NUMBER of OUTBREAKS reported as having taken place, and NUMBER of ANIMALS returned as having been attacked by SHEEP-SCAB and PARASITIC-MANGE in Ireland in the undermentioned period.

Quarter ended	SHEEP-SCAB.		PARASITIC-MANGE.	
	Outbreaks Reported.	Sheep Attacked.	Outbreaks Reported.	Animals Attacked.
30th Sept., 1913,	81	491	11	11

Veterinary Branch,
Department of Agriculture and Technical Instruction
for Ireland, Dublin.

ACCOUNT showing the QUANTITIES of certain kinds of AGRICULTURAL
into Ireland during each WEEK

ARTICLES	WEEK ENDED				
	5th July	12th July	19th July	26th July	2nd Aug.
ANIMALS LIVING—					
Horses, No.	—	—	—	—	—
FRESH MEAT—					
Beef (including refrigerated and frozen), cwt.	3684	—	—	—	—
Mutton, " " " " "	944	—	—	—	—
Pork, " " " " "	—	—	—	—	—
Unenumerated, " " " " "	84	17	—	—	—
SALTED OR PRESERVED MEAT—					
Bacon, cwt.	—	106	130	77	—
Beef, "	21	—	—	—	—
Hams, "	—	—	—	—	—
Pork, "	520	90	—	6 0	260
Meat, unenumerated, Salted " "	—	—	—	—	—
Meat, preserved otherwise than by salting (including tinned and canned), cwt.	21	—	—	—	—
DAIRY PRODUCE AND SUBSTITUTES—					
Butter, cwt.	—	—	—	—	—
Margarine, "	236	243	315	334	202
Cheese, "	—	272	—	—	1
Milk, Condensed, "	119	14	32	89	31
" Cream, "	—	—	—	—	—
" Preserved, other kinds " "	—	—	—	—	—
EGGS, gt. hunds.	360	600	960	—	60
LARD, cwt.	41	—	—	—	—
CORN, GRAIN, MEAL AND FLOUR—					
Wheat, cwt.	81,400	288,800	170,800	96,300	101,100
Wheat, Meal and Flour, "	17,800	5,300	10,100	17,700	19,600
Barley, "	28,700	—	—	8,500	—
Oats, "	31,500	—	17,200	31,800	—
Peas, "	—	20	—	—	—
Beans, "	—	—	—	—	—
Maize, or Indian Corn, "	645,800	330,600	471,400	443,200	175,900
FRUIT, RAW—					
Apples, "	—	—	—	—	—
Currants, "	—	—	45	—	—
Gooseberries, "	—	—	—	—	—
Pears, "	—	—	—	5	3
Plums, "	—	—	—	—	—
Grapes, "	—	—	—	—	—
Lemons, "	—	—	—	—	—
Oranges, "	—	—	—	—	—
Strawberries, "	—	—	—	—	—
Unenumerated, "	—	101	100	—	—
HAY, tons,	—	—	—	—	—
STRAW, "	—	—	—	—	—
MOSS LITTER, "	30	104	—	48	20
HOPS, cwt.	—	—	—	—	—
VEGETABLES, RAW—					
Onions, bushels,	—	—	—	—	—
Potatoes, cwt.	—	—	—	—	—
Tomatoes, "	—	—	—	—	—
Unenumerated, "	—	—	—	—	—
VEGETABLES, DRIED, . . . cwt.	—	—	—	—	—
Preserved by Canning, "	—	—	—	—	—
POULTRY AND GAME, . . . £	—	—	—	—	—

* This Table is confined to the Imports of certain kinds of Agricultural Produce into to a request from this Department kindly consented to separate the Irish Imports (direct) form of Weekly Returns.

PRODUCE imported direct (i.e., from the Colonies or Foreign Countries)
of July, August and September, 1913.*

WEEK ENDED							
9th August	16th August	23rd August	30th August	6th September	13th September	20th September	27th September
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	118	176	160	172	30	41	—
—	—	—	—	—	—	—	—
234	—	440	120	440	120	90	100
—	—	—	—	—	—	—	—
—	—	17	—	—	—	—	—
—	—	—	—	—	—	—	—
266	292	270	263	290	130	—	266
—	314	—	—	—	293	213	—
194	96	180	160	81	70	1	115
—	—	—	—	—	—	203	—
—	—	—	—	—	—	—	—
1,680	1,824	1,296	180	—	—	80	816
—	6	—	—	—	7	17	—
123,000	215,000	304,700	132,300	99,900	136,500	179,800	173,000
7,600	39,500	4,900	3,000	32,800	50,600	26,500	61,300
—	43,800	13,000	42,100	139,600	29,900	—	100
—	17,800	—	70	—	—	—	260
—	—	—	—	—	—	40	—
408,400	190,400	288,900	323,700	474,000	435,300	656,500	142,800
—	—	—	10	—	—	—	—
—	—	—	—	—	—	—	—
30	—	60	140	134	36	203	49
—	—	—	50	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
6	45	40	191	2	29	107	30
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
40	440	120	460	1,002	—	1,506	1,500
—	—	—	—	—	—	—	—
—	—	—	—	3	—	2	9
—	—	—	—	—	—	—	—
3	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—

Ireland from the Colonies and Foreign Countries. The Board of Customs have in answer from those of the United Kingdom, and to supply this Department with them in the

Statistics and Intelligence Branch,
Department of Agriculture
and Technical Instruction for Ireland.

IRISH SPRING MACKEREL

	Collecting Stations	Places where Fish are landed	Date when Fishing may be said to have commenced	Date when Fishing may be said to have ended	Quantity captured
					Cwts.
1	Howth, . . .	Howth, . . .	—	—	1,498
2	Dunmore East, . .	Dunmore East, . .	—	—	337
3	Ballycotton, . .	Ballycotton, . . .	13th May,	31st July,	317
4	Upper Cove, . . .	Kinsale, . . .	29th March,	31st July,	9,080
5	Courtmacsherry, . .	Courtmacsherry, . .	13th May,	30th June,	700
6	Union Hall, . . .	Glandore and Union Hall,	28th March,	10th July,	2,411½
7	Castletownshend, . .	Castletownshend, . .	24th April,	4th July,	414
8	Baltimore, . . .	Baltimore, . . .	29th March,	19th July,	12,382
9	Castletownbere, . .	Castletownbere, . .	1st March,	31st July,	922
10	Waterville, . . .	Ballinskelligs, Rineen, Daniel's Cove, Boola- keel, Dungagon, and Derrynane	10th April,	28th July,	570
11	Knightstown, . .	Valentia Harbour, . .	7th April,	25th July,	27,042
12	Dingle, . . .	Dingle, . . .	1st May,	31st July,	4,030
13	Ballinagall, . . .	Ballydavid and Doneen, . .	April,	June,	275
14	Brandon Bay, . . .	Brandon Quay, . . .	4th March,	June,	258
15	North Aran, . . .	Kilronan, . . .	8th April,	4th July,	506½
16	Roundstone, . . .	Roundstone, . . .	7th May,	8th July,	1,048½
17	Clifden, . . .	Bunowen and Doon- loughan,	24th April,	10th July,	1,684
18	Cleggan, . . .	Cleggan, . . .	7th April,	28th June,	1,750½
19	Mullaghmore, . .	Mullaghmore, . .	17th May,	July,	765
20	Glen Bay, . . .	Malinbeg and Dunalt,	15th May,	15th July,	970
21	Buncrana, . . .	Buncrana, . . .	—	—	1,129½
22	Ballycastle, . . .	Ballycastle, Ballintoy, and Dunseverick	1st July,	31st July,	430
23	Ardglass, . . .	Ardglass, . . .	—	—	1,035
24	Kilkeel, . . .	Kilkeel, . . .	—	—	937
				Total,	70,501½

Area into

FISHERY, 1913.

Total approximate Value.	Number of Steamers carrying the Fish to England.	Number of Ice Hulks.	Number of Tons of Ice Imported	Number of Barrels of Fish cured for ex- portation	Observations.	No.
£ s. d.						
174 3 10	—	—	—	—	Taken in herring nets.	1
109 14 3	—	—	—	—	Taken in herring nets.	2
94 7 0	—	—	—	—		3
2,861 16 0	1	—	—	180		4
420 6 9	—	—	—	231		5
526 8 0	1	—	—	188		6
117 4 0	1	—	—	124		7
3,328 7 6	1	1	—	195		8
226 1 0	—	—	—	70		9
200 0 0	—	—	—	113		10
9,709 0 0	—	—	280	850		11
871 4 0	—	—	—	565	2,225 cases of fish were tinned.	12
81 9 6	—	—	—	—	Fish landed at Ballinagall was cured at Dingle.	13
70 12 0	—	—	—	75		14
130 19 0	1	—	39	63		15
381 16 2	—	—	15	133		16
317 14 0	1	—	—	520		17
628 2 3	1	1	Not known	79		18
131 14 0	—	—	—	—		19
160 0 0	—	—	—	—		20
150 16 0	—	—	—	—	Taken in herring nets.	21
110 8 6	—	—	—	—		22
103 1 6	—	—	—	—	Taken in herring nets.	23
115 19 8	—	—	—	—	Taken in herring nets.	24
21,021 7 11	—	—	—	3,383		

IRISH SPRING MACKEREL FISHERY, 1913—*Continued.*

Mackerel were also landed at the places set forth below, which are not included in the foregoing Return.

Collecting Stations.	Places where landed.	Quantity.	Value.	Barrels cured
		Owts.	£ s. d.	
Ringsend,	Ringsend,	22½	7 16 0	—
Kingstown,	Kingstown,	58	10 6 6	—
Bray,	Bray,	15	7 14 0	—
Greystones,	Greystones,	210	70 0 0	—
Wicklow,	Wicklow,	47	12 17 6	—
Bannow,	Bannow Island and Cullen's Cove,	3	1 7 0	—
Kilmore,	Kilmore,	79	39 10 0	—
Fethard,	Fethard,	98	54 19 0	—
Helvick Head,	Dungarvan,	85	35 14 0	—
Ardmore,	Ardmore,	140	21 0 0	—
Youghal,	Youghal,	143	31 10 0	—
Queenstown,	Queenstown,	89	70 18 0	—
Rathcoursey,	Rathcoursey,	17½	17 16 0	—
Galley Head,	Galley Head,	28	5 0 0	—
Ballyvalley,	Trilispun,	24	6 10 0	—
Schull,	Schull and Cape Clear,	98	35 0 0	10
Crookhaven,	Crookhaven,	162½	60 6 6	—
Bantry,	Bantry,	24	7 4 0	—
Garnish,	Garnish,	7	2 0 0	—
Ballycrovane,	Gurteen and Ballycrovane,	14	5 10 0	—
Lacken Point,	Sneem,	6	1 10 0	—
Carriglea,	Portmagee,	228	33 13 0	64
Calricevein,	Coonana and Coosroom,	60	14 10 0	—
Dunquin,	Dunquin, Cuas-na-naoi and Coosroom,	135	35 2 0	41
Bealbawn,	Bealbawn,	7	2 14 0	—
Brandon Creek,	Brandon Creek,*	78	21 10 0	—
Cappa,	Kilrush,	32	5 0 0	—
Kilkee,	Kilkee, Doonbeg, Tullig and Ross,	29	13 2 10	—
Farraly,	Farraly,	17½	10 1 3	—
Liscannor,	Liscannor,	110½	42 6 4	—
Ballaghaline,	Ballaghaline,	37	19 16 0	—
South Aran,	South Aran,	3	0 19 0	—
Galway,	Galway,	208	67 9 6	—
Inishbofin,	Inishbofin,	103	20 0 0	38
Tully,	Tully,	15	4 0 0	—
Keel,	Keel, Dough and Keem,	182½	58 3 6	—
Blacksod Point,	Blacksod Pier,	54½	24 17 6	—
Belmullet,	Belmullet,	67	31 16 3	10
Ballyglass,	Tip and Inver,	81	40 0 0	—
Belderrig,	Belderrig, Porturlin, and Portacloy,	100	20 0 0	—
Rathlacken,	Rathlacken,	94	44 16 0	—
Ross,	Kilcummin,	30	12 0 0	—
Inver,	Inver,	46	13 16 0	—
Killybegs,	Killybegs,	140½	31 9 0	—
Teelin,	Teelin and Cladnageragh,	174½	40 0 0	—
Downings,	Downings Pier,	214	31 0 6	25
Londonderry,	Londonderry,	35	12 5 0	—
Newcastle,	Newcastle,	9	2 3 6	—
Dundalk,	Giles Quay,	75	50 0 0	—
Balbriggan,	Balbriggan,	4	2 5 6	—
Skerries,	Skerries,	27	11 10 0	—
Rush,	Rush,	8	1 10 0	—
		3,775	1,222 5 2	188

* Fish landed at Brandon Creek was cured at Dingle.

EMIGRATION FROM IRELAND.

TABLE showing, by Destinations, the Numbers of Emigrants (Natives of Ireland) who left the Ports of Ireland during the months of July, August, and September, 1913, and the total for the Nine Months ended the 30th September, 1913, together with the total Number of Emigrants in each of the corresponding periods of the year 1912.

DESTINATION.	July, 1913.	August, 1913.	September, 1913.	Nine Months ended 30th Sept., 1913.
FOREIGN COUNTRIES AND THE COLONIES :—				
America (U.S.),	938	1,358	3,239	18,433
Canada,	579	419	396	6,042
South Africa,	18	10	15	165
Australia,	76	57	82	701
New Zealand,	26	7	4	151
Other Countries,	2	1	1	29
Total,	1,639	1,852	3,737	25,521
GREAT BRITAIN :—				
England and Wales,	62	105	90	683
Scotland,	10	15	27	202
Total,	72	120	117	885
General Total, 1913,	1,711	1,972	3,854	26,406
General Total, 1912,	1,807	2,267	3,956	24,469

The figures in the above Table have been abstracted from the monthly Return published by the Registrar-General for Ireland.

The figures are subject to revision in the Annual Report.

AGRICULTURAL RETURNS OF ENGLAND AND WALES, 1913.

PRELIMINARY STATEMENT for 1913, compiled from the Returns collected on the 4th June; and comparison with 1912.

CROPS.

Distribution.	1913.	1912.	INCREASE.		DECREASE.	
	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Per Cent.</i>	<i>Acres.</i>	<i>Per Cent.</i>
TOTAL AREA (excluding WATER)	37,138,765	37,138,765	—	—	—	—
TOTAL ACREAGE under all CROPS and GRASS (a)	27,129,382	27,174,690	..	..	45,308	0·2
ARABLE LAND	11,058,233	11,335,276	..	..	277,043	2·4
PERMANENT GRASS (a) { For Hay	5,068,692	4,941,534	128,158	2·6	..	..
Not for Hay	11,001,457	10,897,880	103,577	1·0	..	..
TOTAL	16,071,149	15,839,414	231,735	1·5	..	..
Wheat	1,701,588	1,863,364	..	..	161,776	8·7
Barley	1,558,856	1,456,528	102,328	7·0	..	..
Oats	1,974,700	2,072,479	..	..	97,779	4·7
Rye	51,506	54,133	..	..	2,627	4·9
Beans	268,279	277,001	..	..	8,722	3·1
Peas	164,044	201,135	..	..	37,091	18·4
Buckwheat	3,686	4,990	..	..	1,304	26·1
Potatoes	442,035	462,903	..	..	20,868	4·5
Turnips and Swedes	1,053,312	1,072,943	..	..	19,631	1·8
Mangold	419,683	485,664	..	..	66,081	13·6
Cabbage	55,422	61,422	..	..	6,000	9·8
Kohl-Rabi	14,401	20,352	..	..	5,951	29·2
Rape	67,351	79,375	..	..	12,024	15·1
Vetches or Tares	100,945	129,805	..	..	28,860	22·2
Lucerne	57,278	56,375	903	1·6	..	..
Sugar Beet	4,085	3,902	183	4·7	..	..
Carrots	10,026	11,888	..	..	1,662	14·2
Onions	3,958	4,780	..	..	822	17·2
Celery	5,336	5,486	..	..	150	2·7
Rhubarb	6,476	6,357	119	1·9	..	..
Chicory	93	891	..	..	298	76·2
Flax	641	792	..	..	151	19·1
Hops	35,676	34,829	847	2·4	..	..
Small Fruit	76,861	77,997	..	..	1,136	1·5
CLOVER and ROTATION GRASSES { For Hay	1,700,481	1,554,909	145,572	9·4	..	..
Not for Hay	795,351	968,104	..	..	172,753	17·8
TOTAL	2,495,832	2,523,013	..	..	27,181	1·1
OTHER CROPS	98,431	93,847	4,584	4·9	..	..
BARE FALLOW	387,832	273,725	114,107	41·7	..	..
ORCHARDS (b)	243,623	244,825	..	..	1,202	0·5

LIVE STOCK.

	No.	No.	No.	Per Cent.	No.	Per Cent.
Horses used for Agricultural purposes (including Mares for Breeding)	807,316	906,223	..	..	98,907	10·9
Unbroken Horses One year and above (including Stallions)	227,933	234,898	..	..	6,965	3·0
Other Horses	105,854	106,882	..	..	1,028	1·0
TOTAL OF HORSES	261,043	158,007	103,036	65·2	..	..
Cows and Heifers In Milk	1,402,146	1,406,010	..	..	3,864	0·3
Heifers In Calf, but not in Milk	1,707,478	1,848,936	..	..	141,458	7·7
Other Cattle :—Two years and above	556,925	498,983	57,942	11·6	..	..
One year and under two	1,150,625	1,112,195	38,430	3·5	..	..
Under one year	1,160,636	1,239,517	..	..	78,882	6·4
TOTAL OF CATTLE	1,141,281	1,142,089	..	..	808	0·1
Ewes kept for Breeding	5,716,944	5,841,720	..	..	124,776	2·1
Other Sheep :—One year and above	6,699,291	7,148,109	..	..	448,818	6·3
Under one year	3,420,605	3,644,711	..	..	224,106	6·1
TOTAL OF SHEEP	7,010,390	7,260,545	..	..	250,155	3·4
Sows kept for Breeding	17,130,286	18,053,365	..	..	923,079	5·1
Other Pigs	280,855	334,081	..	..	53,226	15·9
TOTAL OF PIGS	1,821,047	2,162,589	..	..	341,542	15·8
TOTAL OF PIGS	2,101,902	2,496,670	..	..	394,768	15·8

(a) Excluding Mountain and Heath Land used for grazing (3,806,599 acres in 1913, as compared with 3,774,655 acres in 1912).

(b) Any Crop or grass grown in orchards is also returned under its proper heading.

AGRICULTURAL RETURNS FOR SCOTLAND, 1913.

PRELIMINARY STATEMENT for 1913, compiled from the Returns collected on the 4th June; and comparison with 1912.

CROPS.

Distribution.	1913.	1912.	INCREASE.		DECREASE.	
	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Per Cent.</i>	<i>Acres.</i>	<i>Per Cent.</i>
TOTAL AREA (excluding WATER) ..	19,070,466	19,070,466	..	..	..	..
TOTAL ACREAGE under all CROPS and GRASS (a) ..	4,799,983	4,821,334	..	..	21,351	0·4
ARABLE LAND ..	3,299,772	3,325,027	..	..	25,255	0·8
PERMANENT GRASS (a) (For Hay ..	160,330	166,735	..	..	6,405	3·8
Not for Hay ..	1,339,881	1,329,572	10,309	0·8	..	..
(TOTAL ..	1,500,211	1,496,307	3,904	0·3	..	..
Wheat ..	54,794	62,373	..	..	7,579	12·2
Barley (including Bere) ..	198,104	191,673	6,431	3·4	..	..
Oats ..	937,914	956,575	..	..	18,661	2·0
Rye ..	5,200	6,810	..	..	1,610	23·6
Beans (to be harvested as Corn) ..	5,999	8,421	..	..	2,422	28·8
Peas ..	848	1,184	..	..	336	28·4
Potatoes ..	149,050	149,768	..	..	718	0·5
Turnips and Swedes ..	431,973	439,592	..	..	7,619	1·7
Mangold ..	1,861	2,822	..	..	961	34·1
Cabbage ..	5,221	5,369	..	..	148	2·8
Rape ..	7,757	6,972	785	11·3	..	..
Vetches or Tares, for Seed ..	901	..	..	..	..	..
Vetches, Tares, Beans, Mashlum, etc., for Fodder ..	10,258	8,182	2,977	36·4	..	..
Lucerne ..	9	33	..	..	24	72·7
Carrots ..	435	610	..	..	175	28·7
Onions ..	177	191	..	..	14	7·3
Flax ..	7	19	..	..	12	63·2
Small Fruit ..	7,135	7,144	..	..	9	0·1
RYE-GRASS and other ROTATION GRASSES and CLOVER (For Hay ..	414,169	423,592	..	..	9,423	2·2
Not for Hay ..	1,057,637	1,044,424	13,213	1·3	..	..
(TOTAL ..	1,471,806	1,468,016	3,790	0·3	..	..
OTHER CROPS ..	1,855	2,252	..	..	397	17·6
BARE FALLOW ..	8,468	7,021	1,447	20·6	..	..
ORCHARDS (b) ..	1,669	1,702	..	..	33	1·9

LIVE STOCK.

	No.	No.	No.	Per Cent.	No.	Per Cent.
Horses used for Agricultural purposes (including Mares for Breeding) ..	137,876	147,917	..	..	10,041	6·8
Unbroken Horses) One year and above (including Stallions, ..	31,704	32,025	..	..	321	1·0
Under one year ..	13,537	13,078	459	3·5	..	..
TOTAL ..	183,117	193,020	..	..	9,903	5·1
Other Horses ..	21,079	12,247	8,832	72·1	..	..
TOTAL OF HORSES ..	204,196	205,267	..	..	1,071	0·5
Cows and) In Milk ..	363,111	361,851	1,260	0·3	..	..
Helpers) In Calf, but not in Milk ..	67,523	74,619	..	..	7,096	9·5
Other Cattle:—Two years and above ..	272,860	232,375	40,485	17·4	..	..
One year and under two ..	301,191	279,063	22,128	7·9	..	..
Under one year ..	240,868	236,468	4,400	1·9	..	..
TOTAL OF CATTLE ..	1,245,553	1,184,376	61,177	5·2	..	..
Ewes kept for Breeding ..	2,912,605	2,971,489	..	..	58,884	2·0
Other Sheep:—One year and above ..	1,213,988	1,271,067	..	..	57,079	4·5
Under one year ..	2,672,214	2,761,811	..	..	89,597	3·2
TOTAL OF SHEEP ..	6,798,807	7,004,367	..	..	205,560	2·9
Sows kept for Breeding ..	14,693	19,668	..	..	4,975	25·3
Other Pigs ..	116,891	136,459	..	..	22,568	16·2
TOTAL OF PIGS ..	131,584	159,127	..	..	27,543	17·3

(a) Excluding Mountain and Heath Land used for grazing (9,114,484 acres in 1912).

(b) Any Crop or Grass grown in Orchards is also returned under its proper heading.

* Figures modified in accordance with classification adopted for 1913.

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No. 2.

DEPARTMENT OF AGRICULTURE
AND
TECHNICAL INSTRUCTION FOR IRELAND.

JOURNAL.

Meeting of the Council of Agriculture—The Vice-President's Address—
The Breeding of Egg-laying Poultry—Disposal of Creamery Refuse—
Field Experiments, 1913—Some Notes on Swedish Forestry—Identifica-
tion of Commonly Cultivated Cereals—Second Irish Egg-laying Com-
petition—Tobacco-Growing in 1913—Nitrogenous Manures—Eelworms
in Narcissus Bulbs—Official Documents—Notes and Memoranda—
Statistical Tables.

FOURTEENTH YEAR

No. 2

JANUARY, 1914.



DUBLIN:

PRINTED UNDER THE AUTHORITY OF HIS MAJESTY'S STATIONERY
OFFICE

By BROWNE AND NOLAN, LTD., NASSAU STREET.

To be purchased, either directly or through any Bookseller, from
E. PONSONBY, LTD., 116 GRAFTON STREET, DUBLIN; or
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T. FISHER UNWIN, LONDON, W.C.
1914.

PRICE SIXPENCE

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NOTICE.

Communications respecting the literary contents of this JOURNAL should be addressed to the Superintendent of the Statistics and Intelligence Branch, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion-street, Dublin.

Communications respecting Advertisements should be addressed to ALEX. THOM & CO. (LIMITED), MIDDLE ABBEY-STREET, DUBLIN; or to LAUGHTON & CO. (LIMITED), 8 WELLINGTON-STREET, STRAND, LONDON, W.C., and not to the DEPARTMENT OF AGRICULTURE AND TECHNICAL INSTRUCTION FOR IRELAND.

COUNCIL OF AGRICULTURE.

The Twenty-fourth Meeting of the Council of Agriculture took place on Friday, 28th November, 1913, in the Lecture Theatre of the Royal Dublin Society, Leinster House, Kildare Street, Dublin (by kind permission of the Council of the Society).

The Chair was taken at 11 a.m. by the Right Hon. T. W. Russell, P.C., M.P., Vice-President of the Department.

The following were present :—

Representing the Department—The Vice-President ; J. R. Campbell, Assistant Secretary in respect of Agriculture ; George Fletcher, Assistant Secretary in respect of Technical Instruction ; J. S. Gordon, Deputy Assistant Secretary in respect of Agriculture and Chief Agricultural Inspector ; D. S. Prentice, Chief Veterinary Inspector ; T. Butler, Superintendent of the Statistics and Intelligence Branch ; J. P. Walsh, Clerk in Charge of Accounts ; J. D. Daly, Senior Staff Officer ; J. V. Coyle ; John Hogan ; H. G. Smith ; R. H. Lee, and M. Deegan.

MEMBERS OF COUNCIL, ACCORDING TO PROVINCES.

Leinster.

James J. Aird, J.P. ; John Bolger, J.P. ; Algernon T. F. Briscoe, J.P. ; John Butler, J.P. ; Thomas M. Carew ; Patrick J. Carey, J.P. ; Denis J. Cogan ; James G. Dooley ; Robert Downes ; Colonel Sir Nugent T. Everard, Bart., H.M.L. ; James P. Farrell, M.P. ; William Field, M.P. ; Rev. T. A. Finlay, M.A. ; Patrick Hanlon ; Michael J. Horan, J.P. ; Captain John E. B. Loftus, J.P. ; James M'Carthy, J.P. ; Matthew J. Minch, J.P. ; Joseph Mooney, J.P. ; George F. Murphy, J.P. ; Patrick J. O'Neill, J.P. ; Charles H. Peacocke, J.P. ; Henry Reynolds.

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William Baille ; Frank Barbour ; Hugh T. Barrie, J.P., M.P. ; R. N. Boyd ; Alexander L. Clark, J.P. ; Frederick C. Cowdy ; Patrick Crumley, J.P., M.P. ; Joseph Davison ; Edward Gallagher, J.P. ; Thomas Macafee, J.P. ; John S. F. M'Cance, J.P. ; Thomas A. M'Clure, J.P. ; H. de F. Montgomery, J.P., D.L. ; George Murnaghan, J.P. ; John Porter Porter, J.P., D.L. ; Colonel R. G. Sharman Crawford, J.P., D.L. ; Michael Shells, J.P. ; Alfred H. Sinton ; Rev. Lorcan Ua Ciarain, P.P.

Munster.

Michael Ahern; John Bourke; Langley Brasier-Creagh, J.P.; Edmund Cummins, J.P.; Thomas Duggan, J.P.; Joseph Dwyer, J.P.; Patrick J. Hogan, J.P.; William Henry M'Cowen; William M'Donald, J.P.; Michael Mescal, J.P.; Patrick Moclair; The Right Hon. Lord Monteagle, K.P., D.L.; Michael J. Nolan, J.P.; Edmond Nugent, J.P.; David Leo O'Gorman; George O'Gorman, J.P.; Stephen O'Mara; Timothy O'Mullane; Hugh P. Ryan; Michael Slattery, J.P.

Connacht.

Patrick D. Conroy, J.P.; P. J. Costello, J.P.; Very Rev. Canon Daly, D.D., P.P.; Rev. Joseph G. Digges, M.A.; Rev. Charles Flynn, P.P., V.F.; John Galvin; James P. MacGuire, J.P.; Rev. P. J. Manly, C.C.; Rev. Philip J. Mulligan, P.P.; Robert P. Wallace, J.P.

Mr. J. D. Daly acted as Secretary to the Meeting.

The minutes of the twenty-third meeting, 4th December, 1912, and of the special meeting held on the 21st January, 1918, copies of which had been sent to each member of the Council, were taken as read and were signed as correct.

Apologies for inability to attend the meeting were received from The Right Hon. Lord Clonbrock, K.P., H.M.L.; Mr. Thomas G. Griffin, J.P.; Mr. William R. Gubbins, J.P.; and the Right Hon. Viscount Massereene and Ferrard, D.S.O., J.P.

The Vice-President delivered his address.*

The Council proceeded to consider the question of "Tuberculosis in relation to the Cattle Industry" which was submitted by the Department for discussion. The matter had previously been before the Council at their meeting on the 4th December, 1912, when the debate was adjourned.

The question was the subject of a lengthy debate, in the course of which Mr. R. N. Boyd (Co. Antrim) proposed, and Mr. Michael Sheils, J.P. (Co. Down), seconded, the following resolution:—

"That it be a recommendation from the Council of Agriculture that the Department should take steps to test with tuberculin all cows giving milk in Ireland, so that cows reacting should be separated from those not reacting, thus permitting the public to know that cows from which they are obtaining milk are free from tubercle."

After considerable discussion the Vice-President said that the whole question and the various suggestions made in regard to it would receive the careful consideration of the Department, who

* See pp. 218 *et seq.*

would also arrange to consult with the Local Government Board in the matter; whereupon Mr. Boyd, by leave, withdrew his resolution.

In connection with the question of the Final Report of the Irish Milk Commission, 1911, the consideration of which had been set down by the Department as a subject for discussion, the Vice-President said that he had thought it well to have each member of the Council supplied with a copy of the Report. Owing, however, to the short period which had elapsed since the Report was issued to the public, he thought that discussion of it might, perhaps, be premature.

The Council, accordingly, did not discuss the Report.

The following resolution proposed by Mr. Hugh T. Barrie, J.P., M.P. (Co. Londonderry), and seconded by Mr. William Field, M.P., was passed unanimously :—

“That the Council of Agriculture for Ireland regrets the continuance of the American embargo against the importation of Irish potatoes. That, in the opinion of the Council, the Irish potato crop is abundant, of excellent quality, and more free from disease than it has been for many years. That the Council approve of the steps being taken by the Department to have the present restriction removed, and hope that these efforts will prove successful.”

The Vice-President said that the Department had been endeavouring, through the Foreign Office, to come to some satisfactory arrangement in regard to the importation of Irish potatoes into America, and had sent Mr. Gill to Washington to lay the case for Ireland fully before the Government of the United States.

In the absence of Mr. William R. Ronaldson, J.P. (Co. Kildare), the following resolution which stood on the Agenda paper in his name was not moved :—

“That the Department be requested to make representations to the Government of the United States of America with a view to the removal of the embargo from the importation of Irish potatoes.”

The following resolution stood on the Agenda paper in the name of Mr. James P. Farrell, M.P. (Co. Longford) :—

“That in the opinion of this Council the Application of Enactments Order (Section 12) of the Local Government (Ireland) Act, 1898, was never intended to apply to the case of farmers and stock-breeders, members of Committees of Agriculture, getting premiums and prizes under the agricultural schemes in operation in Irish counties, and that inasmuch as

the Application of Enactments Order was made by the Privy Council of Ireland and can therefore be repealed or modified by further Order in Council, we request the Vice-President of the Department to bring forward this matter as a member of the Privy Council at its next meeting and have these very obnoxious proposals removed in the case of all members of Agricultural Committees in Ireland."

Mr. Farrell, in bringing forward the resolution, stated that he desired to amend it by omitting all the words after "Ireland" in the fifth line and substituting:—

"we request the Vice-President of the Department to bring forward legislation in the next session of Parliament to have these very obnoxious proposals removed in the case of all members of Agricultural Committees in Ireland."

The resolution as amended was seconded by Mr. Thomas Macafec, J.P. (Co. Antrim).

The Vice-President explained the circumstances in which the Department had found it necessary to consult the Law Officers of the Crown as to whether the Order in question applied to members of Committees established under the Act of 1899. Definite complaints had been made to them in regard to the awarding of premiums and prizes in certain cases. The question of law involved had then to be submitted to the Law Officers, and the Department were advised that the Order did apply and that consequently members of Committees were debarred from certain benefits under various schemes.

The integrity of members of Committees was not questioned. While he regretted that the decision caused some inconvenience to many excellent members of County Committees he could hold out no hope that legislation of the kind suggested by Mr. Farrell could be obtained. The idea underlying the Application of Enactments Order was undoubtedly sound—that members of statutory local bodies being in the position of trustees for the public should not use their fiduciary position to obtain any direct financial benefit from the funds administered by them.

After a lengthened debate the question was put. On a division there voted:—

For the resolution	..	..	..	37
Against	..	..	..	24
Majority for				13

The voting on the resolution was as follows:—

FOR.

Leinster : Algernon T. F. Briscoe, J.P. ; John Butler, J.P. ; Patrick J. Carey, J.P. ; Colonel Sir Nugent T. Everard, Bart., H.M.L. ; James P. Farrell, M.P. ; William Field, M.P. ; Patrick Hanlon ; Captain John E. B. Loftus, J.P. ; James M'Carthy, J.P. ; George F. Murphy, J.P. ; Patrick J. O'Neill, J.P. ; Charles H. Peacocke, J.P. ; Henry Reynolds. *Ulster* : William Bailie ; R. N. Boyd ; Patrick Crumley, J.P., M.P. ; Thomas Macafee, J.P. ; John S. F. M'Cance, J.P. ; Thomas A. M'Clure, J.P. ; H. de F. Montgomery, J.P., D.L. ; John Porter Porter, J.P., D.L. ; Rev. Lorcán Ua Ciarain, P.P. *Munster* : John Bourke ; Thomas Duggan, J.P. ; Joseph Dwyer, J.P. ; William Henry M'Cowen ; Michael Mescal, J.P. ; Patrick Moclair ; Michael J. Nolan, J.P. ; Edmond Nugent, J.P. ; Hugh P. Ryan ; Michael Slattery, J.P. *Connacht* : Very Rev. Canon Daly, D.D., P.P. ; Rev. Joseph G. Digges, M.A. ; Rev. Charles Flynn, P.P., V.F. ; Rev. P. J. Manly, C.C. ; Robert P. Wallace, J.P. (37).

AGAINST.

Leinster : James J. Aird, J.P. ; John Bolger, J.P. ; Thomas M. Carew ; James G. Dooley ; Robert Downes ; Joseph Mooney, J.P. *Ulster* : Frank Barbour ; Frederick C. Cowdy ; Edward Gallagher, J.P. ; George Murnaghan, J.P. ; Colonel R. G. Sharman Crawford, J.P., D.L. ; Michael Sheils, J.P. ; Alfred H. Sinton. *Munster* : Michael Ahern ; Langley Braiser-Creagh, J.P. ; Patrick J. Hogan, J.P. ; William M'Donald, J.P. ; David Leo O'Gorman ; Stephen O'Mara ; Timothy O'Mullane. *Connacht* : Patrick D. Conroy, J.P. ; John Galvin ; James P. MacGuire, J.P. ; Rev. Philip J. Mulligan, P.P. (24).

The following members did not vote :—Mr. Michael J. Horan, J.P. ; Mr. Edmund Cummins, J.P. ; Mr. George O'Gorman, J.P. ; and Mr. P. J. Costello, J.P.

Mr. Patrick Crumley, J.P., M.P. (Co. Fermanagh), moved the following resolution :—

“That the Council is of opinion that the period of detention of live stock at the Port of Dublin should be reduced to one hour before the time of sailing.”

The Vice-President said that the period of at least two hours' detention during which animals were required to be fed and to undergo observation at the ports was prescribed by the Exportation of Animals (Ireland) Order of 1912, and was arrived at subsequent to consultation with the Board of Agriculture and Fisheries and after a conference between the Department and the transit companies. Since the provision was enacted the examination of live stock arising out of the recent outbreak of Foot-and-Mouth Disease in Ireland had become of a much more searching character and the exigencies of the case would not admit of any reduction in the period of detention.

After some discussion the resolution was, by leave, withdrawn.

The following resolution was proposed by Mr. Patrick Crumley, J.P., M.P. (Co. Fermanagh), and seconded by Mr. William Field, M.P. :—

“That in the view of the Council the restrictions under the Swine Fever Regulations should be abolished or reduced very considerably.”

After some discussion, in the course of which the Vice-President stated that the Department would approach the Board of Agriculture and Fisheries with a view to seeing whether an amelioration of the restrictions could not be secured in favour of certain districts, Mr. Crumley asked leave to withdraw the resolution.

The resolution was, accordingly, by leave, withdrawn.

Mr. Patrick Crumley, J.P., M.P. (Co. Fermanagh), said that he desired to draw attention to the treatment of cattle at the Port of Belfast and to inquire whether arrangements could not be made to permit the owners to place their stock in yards where the animals could be fed and watered before being shipped.

Mr. Michael Sheils, J.P., also spoke as to the necessity which existed for improved accommodation for cattle at Belfast.

The Vice-President said that the Great Northern Railway Company were providing, at considerable expense, an up-to-date inspection yard near the quays, and that in connection with the new yard the Company proposed to provide lairage wherein animals might be rested, fed and watered if necessary. The new yard would, it was anticipated, be available in a short time.

Mr. William Field, M.P., proposed the following resolution :—

“That in the view of this Council the detention of Irish animals at the British landing places for so long a period as ten hours is unnecessary, having regard to the fact that over twelve months have elapsed since a case of foot-and-mouth disease was confirmed in this country.”

Mr. Patrick Crumley, J.P., M.P., seconded, and stated that in the circumstances he did not consider it necessary to move the motion to a somewhat similar effect which stood on the Agenda paper in his name.

The resolution was passed unanimously.

Mr. Charles H. Peacocke, J.P. (Co. Wexford), stated that in the absence of Mr. Peter Ffrench, M.P., he desired to propose the resolution which stood on the Agenda paper in Mr. Ffrench's name, viz. :—

“That the Board of Agriculture be requested to recommend Fethard Harbour to the Development Commissioners for a grant.”

Mr. Robert Downes (Co. Westmeath) seconded, and stated that in his opinion the harbours on the east coast of Ireland had not

up to the present received their fair proportion of assistance from public funds.

The Vice-President said that the Department had already recommended Fethard Harbour to the Development Commissioners for a grant, but the Commissioners had refused to sanction the proposal. They had approved of grants in the cases of Kilkeel and Helvick and had refused assistance to Skerries and Fethard. It would be noted that three of these harbours recommended by the Department were on the east coast. When the time came for the Development Commissioners to consider the case of Ireland for further grants for fishery purposes the requirements of Fethard would again be brought under their notice. The Department's annual income for purposes of sea fisheries was £10,000. Of this some £6,000 was spent on policing the coasts, and it was apparent that no important scheme of improvement could be financed from the balance of £4,000 per annum which had also to meet several other large standing charges.

The resolution was passed unanimously.

The following resolution was proposed by the Rev. J. G. Digges, M.A. (Co. Leitrim), and seconded by Mr. James P. Farrell, M.P. (Co. Longford):—

“That the Department be asked to take such steps as may be necessary and possible to bring the so-called ‘Isle of Wight Disease’ (*Microsporidiosis*) and all other infectious diseases of bees, other than Foul Brood, under the operation of the Bee Pest Prevention (Ireland) Act, 1908, or in such other manner as the Department may think proper to protect the Beekeeping industry in this country from the ravages of such diseases.”

The Vice-President stated that with a view to obtaining powers similar to those already conferred by the Bee Pest Prevention (Ireland) Act, 1908, in respect of Foul Brood, for preventing the introduction or spread of other pests or diseases affecting bees, the Department had proposed to have an amendment inserted in the Bee Diseases Bill which was before Parliament last session. Unfortunately, however, the Bill did not reach the stage at which this amendment could be introduced. If a similar Bill were introduced in the coming session he would endeavour to have the amendment necessary for Ireland's requirements inserted. If this could not be done he would consider the question of himself bringing forward a Bill applicable solely to Ireland.

The resolution was passed unanimously.

In accordance with notice of motion, Mr. John Butler, J.P. (Co. Kilkenny), called attention to the working of the Dairy Herd Scheme and made certain suggestions with a view to securing that the best possible results should be obtainable from the scheme.

Mr. Campbell described the working of the scheme in the country

generally, and particularly in Co. Kilkenny, where a special scheme was in operation.

Mr. Butler's suggestions were noted for consideration.

Mr. William Field, M.P., said that he desired to call attention to the increased cost of the transit of live stock to Great Britain owing to the suspension of through-booking consequent on the detention of animals at British landing places, and to inquire whether the Department were taking any action in the matter.

The Vice-President said that the Department had been in communication with the Board of Agriculture and Fisheries and with the transit companies on the subject. The difficulty had arisen owing to the fact that when live stock were under detention at landing places in Great Britain the continuity of charge by the carrying companies had in some cases been broken. Where, however, landing places were in the possession of the railway or steamship companies and the animals consequently remained in their possession, as at Holyhead, Heysham, Fleetwood, etc., it was understood that through rates were in force. Through rates, it would appear, had also been arranged in regard to Irish live stock landed at Birkenhead.

The following resolution was proposed by Mr. William Field, M.P. :—

“That this Council requests the Department to inquire into and report upon the new Serum Treatment for Swine Fever.”

The Vice-President said that inquiries were being made by the Department into this new treatment for swine fever. The treatment was, he understood, preventative, not curative. The whole question was at the moment being considered by a Committee appointed by the Board of Agriculture and Fisheries. The Department proposed to watch the proceedings of this Committee and to await the result of their investigations.

Mr. Field expressed his satisfaction at the action being taken and the resolution was, by leave, withdrawn.

Mr. Edward Gallagher, J.P. (Co. Tyrone), proposed the following resolution :—

“That this Council recommends the Department of Agriculture to consider the case of farmers who, by reason of proximity to fishing streams, are liable to prosecution for allowing flax water to escape from their dams, and that it is the opinion of this Council that the Department should assist such farmers to provide retention dams. The frequent prosecutions brought by the Conservators of Fisheries have resulted in much unpleasantness, and in some cases farmers have been compelled to abstain from sowing flax, as they found it impossible to steep it without running the risk of a heavy fine or writ of injunction.”

After some discussion the Vice-President said that the Depart-

ment would inquire into the matter and would consider whether something could not be done to secure observance of the fishery laws without inflicting undue hardship on flax growers.

The resolution was then, by leave, withdrawn.

The following resolution was proposed by Mr. R. N. Boyd (Co. Antrim), and seconded by Mr. T. A. M'Clure, J.P. (Co. Armagh):—

“That it would be advisable for the Department to refuse premiums to all bulls that were unable to pass the Tuberculin Test.”

Mr. Campbell pointed out that power to refuse premiums to bulls which failed to pass the Tuberculin Test was already in the hands of County Committees, and stated that the Department thought it better that the exercise of this power should remain in the discretion of each County Committee rather than that the rule should be made imperative all over the country.

Mr. James P. Farrell, M.P. (Co. Longford), proposed as an amendment:—

“That the question of refusing premiums to bulls which failed to pass the Tuberculin Test be left as at present in the hands of County Committees.”

Mr. Robert P. Wallace, J.P. (Co. Leitrim), seconded the amendment, which, on a show of hands being taken, was adopted by nine votes to five.

Mr. James P. Farrell, M.P. (Co. Longford), said that he desired to call the attention of the Department to a case in which a wood in Co. Longford which had been purchased under the Land Acts had been sold to a firm of timber merchants and was about to be felled. A protest in the matter had been addressed by the County Council to the Estates Commissioners, who had replied that the matter was one for the Department.

The Vice-President stated that the case referred to was probably one in which under the provisions of the Land Act of 1909 the consent of the Department was necessary before timber could be felled. The Department would have the case inquired into without delay.

Mr. Michael J. Horan, J.P. (King's County), said that he had been asked by his County Committee to request the Department to arrange for surprise visits to premises on which premium bulls and boars were kept. There was reason to believe that in some cases these animals were not suitably accommodated and treated.

Mr. Campbell said that apart altogether from the question of expense there were a number of difficulties in the way of arranging for such visits. County Committees were themselves expected to see that animals in respect of which premiums were being paid were properly kept. However, the Department would see what could be done to meet the request put forward by Mr. Horan.

The proceedings terminated at 5.25 p.m.

THE VICE-PRESIDENT'S ADDRESS.

MY LORD AND GENTLEMEN,

Before proceeding to the formal business of the meeting I wish to pay a tribute to the memory of Mr. P. A. Meehan, M.P., Mr. Reade, D.L., and Mr. William Smyth, J.P., who have passed away since our last meeting. All these gentlemen took an active and useful part in public affairs, and we shall miss them from our counsels. Queen's County have appointed Mr. J. J. Aird, J.P., to succeed Mr. Meehan; Mr. F. C. Cowdy, of Banbridge, has been nominated by the Department in succession to Mr. Reade; and County Down have yet to appoint a representative in the room of Mr. Smyth.

In accordance with the arrangements made at the meeting of the Council in January last, which was the third meeting within the short space of four months, the ordinary Half-yearly Meeting, usually held in May, was not convened.

FOOT-AND-MOUTH DISEASE.

Two special meetings were held in connection with the outbreak of foot-and-mouth disease. I am happy to say that the country has now been clear of any case of the disease for a period of over twelve months. A full and detailed report of the outbreak which wrought such lamentable havoc in Ireland last year has been issued by the Department. A perusal of this report, copies of which have been sent to the members of the Council, will show that the outbreak lasted from the end of June to the beginning of November, a period of a little over four months, and that there were altogether 68 outbreaks in 7 counties. This compares most favourably with the previous outbreak in 1883-4, which overran 20 counties and lasted for more than 15 months, 3,541 separate outbreaks being then reported, and the animals affected numbering 115,641. The cost to the State of the recent outbreak amounted to £39,438. This does not in any sense represent the loss to the country or to the cattle trade. But I need not repeat the story. It is fully told in the official report on the subject. The only point to which I desire to draw particular attention is the vindication which the report contains not only of the Irish veterinary officers, but also of the Department, who, it will be remembered, strongly held to the unwisdom of enlisting the aid of Inspectors from across the Channel—a proposal which was advanced by some members of this Council, and even in Parliament itself.

The Council will have noticed the report of a recent outbreak of foot-and-mouth disease on a farm in the South of England, upon

which a large number of Irish cattle were located. The advices received from the Board of Agriculture and Fisheries showed that the outbreak originated amongst other stock on the farm. The disease, I may mention, is at present very prevalent in France, Germany, Switzerland and elsewhere on the Continent, and nothing but constant vigilance will secure us from a repetition of our late experiences.

ROYAL VETERINARY COLLEGE.

With the cessation of the outbreak last year a serious duty was at once cast upon the Department. It was considered essential to review the whole situation in Ireland as regards veterinary administration and education. It will be admitted by everyone that notwithstanding the extreme tension to which our veterinary staff were so suddenly subjected, the fact that they succeeded in holding up the disease wherever it appeared and in stamping it out in a few months is a high testimony to their efficiency and to the efficiency of the system in which they played so conspicuous a part. The Department thought it wise, however, to take steps to strengthen, where possible, the veterinary administration in the country generally. In this general survey the position of the Royal Veterinary College came under consideration, and conferences took place between the Governors of the College and the Department. As a result, the Governors, taking a broad and statesman-like view, and having at heart what they believed to be the best interests of the College and of Irish veterinary education generally, decided to petition the Crown for a new charter which would enable them to hand over the administrative and financial control of the institution to the Department. In the contemplated change, however, it is proposed that the Board of Governors will act as an advisory body and give the Department their valuable assistance and advice in the working of the College. On the completion of the whole scheme of reorganisation the country will, so far as veterinary science and organisation are concerned, be in possession of a system fully adequate to our present needs, and capable of coping with any future emergencies.

THE TUBERCULOSIS ORDER.

While I am on the subject of animal diseases I must make some reference to the Tuberculosis Order. The main object of this Order is the protection of our live stock from tuberculosis. Another justification for its enforcement is the consideration that the measures adopted against animal disease in Ireland should be no less complete than those taken in Great Britain, if our vast export trade under this head is to be maintained without interruption.

The Treasury have provided a grant from the Exchequer to meet half the expenditure of local authorities in the payment of compensation for animals slaughtered under the Order. Some difficulty was at first experienced in securing the adoption of the Order in many districts, but it may now be said that throughout almost the whole of Ireland its advantages are either available or in a fair way of being made available for farmers and others concerned. In the counties of Clare, Longford and Kerry, however, no action has, as yet, been taken in the matter. The Department have not lost hope that the local authorities in these counties will reconsider their attitude and not continue to neglect their statutory obligations, thereby depriving the owners of live stock throughout the districts in question of a valuable means of improving their herds, and also imperilling the entry of their cattle into Great Britain.

SHEEP SCAB AND SWINE FEVER.

There are two other animal diseases in regard to which a word of warning is very necessary at the present time. I refer to Sheep Scab and Swine Fever. The inspection of sheep at the Irish ports before shipment is much more rigorous than it formerly was, and there is also a very critical examination of these animals at the landing places in Great Britain. Owing to these increased precautions a considerable number of outbreaks of Sheep Scab in Ireland have been brought to light. No one can grumble at any efforts on the part of the British officials to prevent the introduction of this disease into England and Scotland. The Department have repeatedly appealed not only for the due enforcement of their Sheep Dipping Orders by local authorities, but for the willing co-operation of sheep owners in this matter. Unless the greatest care is taken in having sheep efficiently dipped not once, but twice, there is bound to be infinite loss and trouble to sheep breeders and exporters. As regards Swine Fever, this disease still exists in the country. The Swine Fever Orders which are in force, unlike those in the case of Sheep Scab, do not provide a specific for the disease; but a great deal may be done towards its prevention by cleanliness and proper care of the animals, as well as by early notification to the police of any symptoms of the disease which may be observed. If the farmers of Ireland desire to keep the trade between Great Britain and Ireland in both sheep and swine as open and effective as it is at present, they must see to it that nothing on their part is left undone in combating these diseases.

DEAD MEAT INDUSTRY.

At this point I should perhaps say something of the dead or dressed meat industry. When the outbreak of foot-and-mouth

disease was at its height, and even for some time after it had ceased, a large number of people considered that it would be possible and profitable to develop this industry. Enterprises of the kind were already in existence in Wexford and Drogheda. Since the outbreak subsided and the transit of cattle regained its normal freedom, not so much has been heard of the industry. None of the projects which were mooted have arrived at the point of fruition. Proposals to start limited liability companies have been put forward, and it appeared at times as if great progress was being made. It may be that things are going forward in this matter or that they are for some reason only in a state of suspended animation, but at the moment nothing is publicly known of the position occupied by the various dead meat projects which found support during a period of strain and anxiety for everyone interested in the Irish cattle industry. This, in my opinion, is to be sincerely regretted, for the visitation of foot-and-mouth disease placed the cattle industry in an extremely precarious position. No one believes that a dead meat industry could entirely replace the present considerable trade in the shipment of fat cattle; but it might act as a useful and valuable adjunct to these activities. The facts are all that concern us at the present moment, and these appear to be as I have stated.

AGRICULTURAL EXPORTS AND IMPORTS.

A brief review of our agricultural exports and imports for the year 1912 gives scope for some interesting reflections. The annual value of the output of agricultural produce, which, of course, includes home consumption, is roughly estimated at about £50,000,000. Considering the value of our agricultural exports in 1912 (£29,030,000), it is a remarkable fact that we imported in that year goods to the value of £21,300,000 under the same head. Our total agricultural export and import trade has been increasing considerably for years past. This is true of our trade generally, but I am confining myself to agriculture. In 1912, agricultural exports constituted 43 per cent. of our total export trade, and agricultural imports 29 per cent. of the import trade. This shows a decreased ratio in five years of 7 per cent. and 1 per cent. respectively, although the value of the goods in each case actually increased.

Our agricultural exports increased from £28,300,000 in 1911 to £29,030,000 in 1912, an increase of £730,000. This is very satisfactory in view of the fact that our cattle exports decreased by £1,300,000 owing to the outbreak of foot-and-mouth disease. Of course we have since won back this loss, as during the first half of this year we exported 586,575 cattle as compared with 321,791 in the first half of last year—an increase of 264,784 cattle. But there is this ground for qualifying our satisfaction at the increased

exports of agricultural products. Had the same prices prevailed in 1912 as in 1911 there would have been an actual decrease of £591,000. There was a very large increase of £726,000 in our bacon and ham exports, and of £122,000 in the case of pork, with a corresponding increase of £940,000 in the imports of maize. Here again there is ground for reflection. While only one-eleventh or £63,000 of the increase in the bacon and ham exports was due to increased prices, the high price of feeding stuffs and of pork induced many pig-keepers to sell their breeding stock. Our pig population decreased from 1,320,000 in June, 1912, to 1,060,000 in June, 1913—a decrease of over a quarter of a million. The decrease in the number of sows in the same interval was 20 per cent. There was an increase of £489,000 in our butter exports, only £7,000 of which is accounted for by the slight increase in price that took place in the case of this article. The other principal increases were:—beef and mutton, £250,000; hides and skins, £104,000; wool, £198,000; poultry, £187,000, and horses, £153,000.

The principal decrease was in the value of cattle exported which, as stated, amounted to £1,300,000. Potatoes show a decrease of £128,000, of which £42,000 was due to decreased shipments. It may be of interest to state that the value of our export of potatoes to the United States in the year ended 30th June, 1912, was £492,000. The egg exports show only the slight decrease from £2,940,000 in 1911 to £2,927,000 in 1912, or £13,000. Had prices remained the same the total loss as compared with 1911 would have been £79,000.

The value of the agricultural imports amounted to £21,300,000 in 1912, showing an increase of £1,900,000. These imports, as I have stated, constitute 29 per cent. of our total imports, which is an extraordinarily high percentage for an agricultural country such as Ireland. It is estimated that no less than £15,900,000 worth of the agricultural imports could be produced easily at home, the remaining £5,400,000, representing goods not produced in these countries. For instance we imported wheat to the value of £3,300,000, wheat flour to the value of £2,600,000, flax to the value of £2,400,000, and bacon and hams to the value of £1,800,000. I may add that, provided the value of the exports of the smaller agricultural industries—breakfast table commodities as they have been called—is maintained during the current year, these exports will in the ten years for which the records will be available amount to over £100,000,000.

POTATOES.

A good deal has been written and spoken about potatoes during the past few weeks. The passing of the American Tariff Bill, which, I may incidentally mention, opens up a very considerable

outlet for Irish produce, has impressed Irish potato growers with the idea that a practically new and important market has been opened for this article of consumption. As I have pointed out, our potato trade with the United States is already an extensive and valuable one. The Department have been keenly alive to the possibilities under the new American Tariff, and before any of the interests directly concerned had moved in the matter, they were hard at work endeavouring to remove the obstacles which have intervened and prevented the development of this opportunity. The facts are simple and can be briefly stated. Potatoes are now on the free list, and so far as the tariff is concerned, can enter the United States free of duty. But like every other country the United States have a right to say that produce entering their ports must do so under conditions of general safety and without any possible detriment to home interests; and it so happens that the entry of potatoes into the States is seriously hampered, or rather entirely blocked, by regulations made by the American Department of Agriculture with a view to prohibiting the importation of potatoes contaminated by certain specified diseases. The Irish Department, through the Foreign Office, approached the American Government and laid before it the case of Ireland. In the correspondence which ensued it was admitted by the American Government that Ireland was almost satisfactory in the matter of healthy potatoes as compared with other countries. We have urged upon the American authorities that inasmuch as potatoes in Ireland this year are an exceptionally fine crop, and exceptionally free from disease, and inasmuch as it is possible to guarantee inspection of the potatoes before they leave our ports, Ireland should be treated as distinct from Great Britain, and that we should be allowed to benefit from our comparative freedom from disease. The Department, after consultation with the Foreign Office, decided to send an officer to Washington to lay the case more fully before the American Government than could be done by correspondence. Mr. Gill is now in Washington on this mission, and whatever be the result of his work there, I wish it to be known to the Council, to the potato growers, and to the public, that the Department have missed no opportunity of pressing the matter, and have allowed no chance to go by that would open the ports of the United States to the Irish potato export trade. I notice that two resolutions bearing on this question are on the agenda, but in all the circumstances I would suggest that, if they be not withdrawn, the discussion be of the briefest description. The matter is practically *sub judice*, and Mr. Gill's negotiations in Washington might be hampered rather than helped by any discussion at this meeting.

AFFORESTATION.

The work of afforestation, while proceeding satisfactorily to the full extent of the Department's resources, does not, I regret to say, progress at a rate commensurate with its importance. There is, as you are aware, a Forestry School and Demonstration Forest at Avondale, in County Wicklow. At this school a number of apprentices who have undergone a preliminary course of instruction in one of the woods belonging to the Department are trained as working foresters with a view to their employment either by the Department, by local authorities, or by private individuals who engage in forestry operations. There are this year 16 apprentices in training at the Department's woods at Dundrum, County Tipperary, and at the Avondale Forestry School. The school is maintained out of the Endowment Fund of the Department. As regards the Treasury grant of £6,000 a year, annually voted by Parliament, the residue of something like a dozen estates which were in the hands of the Estates Commissioners have been purchased. This brings to an end our work in this connection, as the entire grant is now being expended in the payment of the annuities to the Estates Commissioners and on the upkeep and maintenance of woods on tracts of lands thus acquired. The receipts from these lands are paid into the Treasury. I think it right to say here that in the matter of the purchase of these lands, there has not been a single difficulty between the three bodies concerned—the Treasury, the Estates Commissioners, and the Department. Everything has been carried through amicably and a large area of valuable woodland has been saved to the nation which would otherwise inevitably have been destroyed.

Another branch of this work of afforestation is carried on by the Department and another State institution, the Development Commission. Three or four years ago this body set aside a sum of £25,000 for reafforestation in Ireland. The money was not given as a grant, but is being advanced, as required, on loan for thirty years without interest, the question of the repayment of the loan to be considered at the end of the period mentioned. I should add at this point that in connection with the lands acquired by means of this money, all receipts arising from grazing lettings, from the sale of timber, or from any other source, have also to be paid over to the Treasury every year. This, I understand, is the invariable rule in all such cases, but in the case of a loan without interest these payments ought to be taken into account when the question of repayment comes up. Under this head, 8,652 acres of afforestable land have been acquired at a cost of £19,323 in Cork, Wicklow, and Queen's County. Actual possession has been obtained of 6,754 acres, and in a very short time the whole of the land will be taken up and dealt with. The Department have sub-

mitted an application to the Treasury for further advances from the Development Fund up to £50,000 for additional purchases during the next few years. The proposal of the Development Commissioners to consider afforestation schemes submitted by County Councils has elicited little response, only one body, the Kildare County Council, having taken definite steps to secure advance. The Councils of Kildare and Westmeath are the only local authorities which have schemes in operation for the preservation of small woods.

TREES ON PURCHASED HOLDINGS.

The Land Act of 1909 provides that tenant purchasers who fell or uproot trees which are necessary for the shelter or ornament of their holdings, without having first obtained the consent of the Department, are liable to a penalty on summary conviction. Since the passing of this Act, 259 applications for the necessary permission have been received and investigated by the Department. In the majority of the cases the proposed fellings were agreed to, but in a great many instances it was stipulated that adequate replanting with useful trees should be carried out. Under an arrangement with the Inspector-General of the Royal Irish Constabulary, the police furnish reports of cases in which tree felling is observed on holdings purchased under the Land Acts. The issue of a notice warning holders of the restrictive provision referred to is generally found sufficient to prevent indiscriminate felling. In one instance, however, in which a large area of plantation was affected, proceedings were instituted, and the holder was convicted and fined.

CHAIR OF FORESTRY.

The Council will be interested to learn that during the past year the Department, out of Development Funds, have established a Chair of Forestry at the Royal College of Science, and have been so fortunate as to secure the services of Mr. Augustine Henry, M.A., F.L.S., M.R.I.A., who at the time of his appointment was Reader in Forestry at the University of Cambridge. This is an important addition to the teaching staff of the College. Professor Henry will have general charge of higher forestry education and research, and it will now be possible for our agricultural students at Glasnevin and for others to secure higher instruction in forestry, to which previously they had no access.

TOBACCO GROWING.

I now come to tobacco. As regards the past season I may say that on the whole it was quite favourable for tobacco cultivation.

The yield and quality of the crop promise to be above the average. The Treasury grant of £6,000 a year comes to an end with the present season. Arrangements for the extension of these experiments next year are well under way. Two grants of £28,675 each, covering a period of ten years, have been sanctioned by the Treasury on the recommendation of the Development Commissioners. Sir Nugent Everard and Lord Dunraven are to be the two experimenters. I see no reason at all why the preliminaries in connection with these experiments should not be completed in time for the successful initiation of the work next season. There is, however, some little difficulty being experienced in the case of the Wexford tobacco growers at Tagoa. They were unable to come to a satisfactory arrangement with Sir Nugent Everard, but have expressed their readiness to form an association for the special purposes of the tobacco-growing scheme in Wexford. Any proposal of the kind is, of course, subject to the concurrence of the Development Commissioners. The case of these growers is at present under their consideration, and will, I hope, be satisfactorily met. As the Wexford growers were the first to take the field in this matter, I should be sorry if for any reason they were cut off from further participation in this experiment. The Department will continue to use their good offices to bring about a satisfactory arrangement as soon as possible, as further delay may involve the loss of the season that will be upon us ere long.

WEEDS AND AGRICULTURAL SEEDS ACT.

I wish now to refer to the Weeds and Agricultural Seeds Act, mainly for the purpose of reporting progress. In regard to the Weeds section of the Act, the Councils of 23 Counties have adopted its provisions, King's County having come in during the past year. This leaves ten counties which have not yet done so, viz., Cavan, Clare, Cork, Donegal, Leitrim, Longford, Sligo, Waterford, Wexford and Wicklow. I would again appeal to the Councils which have delayed taking action in this direction to remove the consequent stigma from their counties. Notices to destroy weeds were served by the Department in 12,166 cases during the past season. In the vast majority of these cases the notices were complied with, but in about 90 cases prosecutions had to be instituted. The Department regret the necessity for these prosecutions. This is not a coercive measure. It is designed to protect the man who keeps his land clean from the carelessness of his neighbours who do not take the pains to do so. And it is a valuable aid to good farming.

In connection with the Seeds section of the Act I have something of importance to record. During the past year the Department have held two conferences with the seed cleaners in Belfast, the centre of the seed cleaning trade in Ireland. There can be no

doubt that a large quantity of worthless seed had been put on the market, annually and mainly in the West and South-west of Ireland. As a result of these conferences the 16 firms of seed cleaners who constitute the bulk of the trade agreed to wholly discontinue the sale for use as agricultural seeds in Ireland of perennial rye grasses below 20 lbs. bushel weight, and Italian rye grass below 16 lbs. bushel weight, as well as all such mixtures as white and brown hayseed, cleanings, blowing and holeus. The importance of this agreement will be obvious when it is borne in mind that its effect should be to cut off the supply of those so-called agricultural seeds which have hitherto constituted the great bulk of the inferior samples of grass seeds tested at our Seed-Testing Station. It is only those who are called upon to administer Acts of Parliament with discretion, and are forced to recognise that things cannot always be driven at breakneck speed, who are able to understand the position created by such an arrangement as this. The Department, instead of hastily resorting to the punitive powers conferred upon them by statute, sought by conference to deal with the difficulty ; and they succeeded by consent of the trade in eliminating from the market much of the seed which has in the past proved so injurious to the farmer.

I desire to say from this platform that the action of the seed cleaners in this matter is extremely creditable to the Irish seed trade. It is, in the Department's view, a hopeful augury for the still further improvement of the standard of agricultural seeds in Ireland.

But it may be said that the Department have no security in a matter of this kind. We are quite satisfied with the honourable undertaking which has been given by a great and important trade ; and I need scarcely add that any breach of this undertaking would react injuriously upon the business of the reputable firms concerned. This is probably the first occasion upon which agriculturists generally have learned of the results achieved in connection with these two conferences. Much of the work of the Department does not lend itself to advertisement, and it sometimes is very much, and I fear often wilfully, misunderstood. Apart altogether from the arrangement with the seed cleaners, which has not come fully into effect yet, there has been a distinct improvement this year. And the Seed-Testing Station is not only being used for these public purposes ; it is being increasingly availed of by merchants, farmers and others, and is, in my judgment, one of the best monuments to the efficacy of the Department's work.

AGRICULTURAL INSTITUTES.

The work in connection with the new Agricultural Schools for North-east and North-west Ulster has made rapid progress since

my last report on the subject. The School for North-east Ulster, convenient to the town of Antrim, was recently opened with 11 students for the first session. The Department paid the entire cost of the land and of the equipment, amounting altogether to £10,500, and the school is under the management of the County Antrim Committee of Agriculture, with the Department, of course, in the background for such advice and assistance as may be necessary. The school for the North-west of Ulster, in the neighbourhood of Strabane, is now practically completed. In this case the cost has been some £8,500, and although the Department retain control and management, they will have the assistance of an Advisory Committee, consisting of representatives of the Tyrone, Derry and Donegal Committees of Agriculture. It is hoped that the school will be ready for opening at the end of January next. These schools with those at Ballyhaise and Cookstown complete the network of our higher educational establishments in the province of Ulster, and represent a capital expenditure of £50,000 for the Northern province.

THE MILK COMMISSION REPORT.

In November, 1911, a Viceregal Commission was appointed for the purpose of inquiring into the alleged scarcity of milk in Ireland, and to report upon the causes of the deficiency where it exists, its effect upon public health, and the means whereby the deficiency can be remedied. The Commission was also charged with an inquiry into the danger of contamination and infection in the present milk supply, and the methods best adapted to guard against this danger.ittings were held in all parts of Ireland, and a mass of evidence was collected. The Report has recently been published, and as it contains many recommendations directly affecting the agricultural community, I have thought it desirable to forward a copy to each member of the Council with a view to its discussion here to-day. While not proposing to examine the recommendations in detail, I should like to call attention to two matters of special importance.

The first concerns the scarcity of milk. One of the most alarming facts brought out by the Report is that a very large number of children and young people in this country are being reared without a sufficient supply of milk. In the cities the difficulty is, to some extent at least, a question of lack of means for buying milk. But it is not alone in the cities that the milk supply is deficient. Unfortunately it appears that in a large number of country districts, especially during the winter months, the children of the labouring and even of the farming classes are not receiving an adequate supply. In some instances it would seem that owing to a fitful demand and the trouble attendant on the retailing of milk

at farmhouses to labourers and others, farmers prefer to send their milk to the creameries, and to receive in one cheque payment for the proceeds of their dairy. In these creamery districts the difficulty is not lack of milk supply, but of an organised demand for it. It is not only in districts where creameries exist, however, that this trouble arises. There are also large areas of the country—the grazing districts in particular—where milch cows are not kept and where, therefore, milk cannot be had even in summer. The organisation of the demand is recommended as the remedy for the creamery districts; but in the case of the grazing lands the Commission recommends that, under future land legislation, power should be given to the Estates Commissioners to reserve cow plots for the use of labourers and dwellers in villages. I may say that if the Council feel themselves in a position to concur in this proposal, their opinion would undoubtedly carry great weight in bringing about the legislation suggested.

The second part of the Report deals with the important question of the purity of the milk supply. Cities such as Dublin and Belfast receive large quantities from the country, and it is extremely probable that the municipal authorities will seek powers such as have been given to English cities, to go into the districts from which the milk comes and to exercise some control over its purity. Such a demand is one that must be taken very seriously. If, however, it is not conceded it will be incumbent upon the local authorities charged with the administration of the Dairies and Cowsheds Order to satisfy the city consumer that the milk sent in is pure, clean, and free from disease. The Commission does not recommend that such powers as I have mentioned should be granted to the cities, but makes a recommendation which would involve the transfer of the administration of the Dairies and Milkshops Order from the Rural District Council to the County Council, and the charging of the Department of Agriculture, through its veterinary officers, with seeing that this order is properly carried out. Inasmuch as the supervision of animals falls partly on the Local Government Board and partly on the Department, it is suggested that a Committee of these two bodies should be constituted to secure the proper co-ordination of the administration.

These are far-reaching proposals, but it is possible that the circumstances are such as to warrant the changes recommended. I have not yet made up my mind as to how far I personally am prepared to concur in these or any of the Commission's recommendations. I have not even discussed any of the points mentioned with the other Department concerned, viz., the Local Government Board; but I can assure you that any suggestions which you may have to make will have our earnest consideration.

MOTOR BOAT FISHING.

Coming to the fisheries, while there are many points of interest to which I might refer, the outstanding feature is the change that is taking place—largely on our initiative—in the nature of the craft engaged in the fishing industry. The substitution of motor power for sails, which began with the building of the first large motor boat for Arklow in 1907, is proceeding as rapidly as the resources at our command permit. The Department has advanced on loan some £39,000 out of their own funds, of which over £5,000 was used in connection with steam drifters. This has involved so heavy a strain on the funds available that the provision of additional money from other sources has had to be faced. So many urgent requests for assistance have recently been received that the Department have had to apply to the Development Commissioners for a loan of £4,000 to be used by way of loan to the fishermen. The Commissioners have agreed to recommend the Treasury to sanction an advance at 3 per cent. per annum. In so far as loans made out of this particular fund are concerned, the Department must therefore increase to 3 per cent. the rate of interest ($2\frac{1}{2}$ per cent.) which has hitherto obtained in the case of such loans, and be prepared to meet out of their own funds any loss of the capital sum that may arise from bad debts.

PICKLED MACKEREL AND HERRING.

Another item worthy of reference is the bearing of the new American tariff on our export trade in pickled mackerel and herring. The abolition of the import duty on these articles ought to lead to a considerable extension of our trade in this direction with the United States.

TECHNICAL INSTRUCTION.

As regards technical instruction, there has been a general and continuous development of the various schemes. Practically every Urban District in the country has a scheme of Technical Education adapted to its peculiar needs. I have not time to refer in any detail to the work of the Technical Instruction Branch, but I may mention the gratifying fact that, notwithstanding the absence of a building grant, Urban authorities generally have realised the necessity for, and have made more or less satisfactory arrangements in connection with, the provision of suitable buildings in which to carry out the schemes approved for their districts, though this has thrown a very heavy burden upon their funds.

I have now brought under review the salient points in the work of the Department. The Council are aware that most of this work is distinct from that carried out by the County Committees. It is only possible briefly to sketch what is being done, but such particulars as I have given will indicate the progress that is being effected in every direction.

THE BREEDING OF EGG-LAYING POULTRY.

By JAMES WILSON, M.A., B.Sc., *Professor of Agriculture, Royal College of Science for Ireland.*

Because of its economic importance, it will be well to consider Dr. Raymond Pearl's work at the Maine Agricultural Station on the inheritance of egg-laying in poultry. Dr. Pearl's final achievement is the result of a long course of patient and persistent experiment and of incisive thinking upon complicated phenomena. Consequently it is not to be understood by a cursory or casual examination. Thus this paper cannot be made easy reading ; but it will have done some good if it be grappled with till it be understood by a few of the leading breeders of egg-laying poultry in Ireland.

Till five or six years ago the Maine Agricultural Station had been endeavouring to improve the egg-laying powers of its poultry on the system generally adopted in all countries, but with no more than the usual success and with the usual amount of disappointment. The fundamental ideas governing the system were that egg-laying ran in strains, and that both parents were equally responsible for the progeny produced. In accordance with these ideas it was the practice to retain the daughters or grand-daughters of good laying hens, and, since it was thought wrong to mate them with their own brothers or cousins, to mate them with males descended from other good laying hens or from some other egg-laying strain. More recently, the more careful breeders have been insisting that the males should be the sons of good laying hens, but breeders as a rule have been satisfied if they were of what they believed to be an egg-laying strain. Yet even the more careful breeders have been sadly disappointed with their results, which have been bad as often as good, and always characterised by the most persistent uncertainty. Their experience has been similar to that of breeders of other kinds of stock who have put their faith in *strains*, excepting that perhaps it has been still less successful. As will be seen later, the two fundamental ideas were both fallacious, for the strain may be broken even in the immediate progeny of the very best parent, and of the causes of good egg-laying one at least does not descend through the female, but through the male. That the cock was more important than the hen in the production of egg-laying poultry was first suspected only two or three years ago, when some other avian characteristics had been shown to descend through the male ; and, utilising such previous experiments as were pertinent, Dr. Pearl at once devised and carried out others by which the suspicion could be put to the test.

As it is next to impossible to understand Dr. Pearl's results without some acquaintance with the Mendelian theory, we shall first of all discuss so much of that theory as is necessary to meet the case.

The Mendelian Theory. The fundamental position is that plants and animals bear observable characteristics or "characters," as they are called, and that each is the result of one or more unobservable causes or factors which make it what it is.

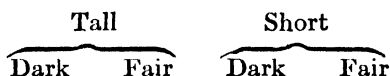
In most species there are many varieties, some bearing some characters, others bearing others. Among fowl, for instance, some are black, some white, some of other colours; some have single combs, some rose combs, some split combs, some no comb at all; some have long legs, some short, some have feathery legs, some clean; some are good layers, some are bad, and so on. For each of these characters there are one or more causes or factors.

It was common knowledge that when parents of two different varieties were mated, the characters in which the parents differed re-appear again among their descendants in unexpected and bewildering order. It was the first part of Mendel's work to discover that the characters in which the parents differ do not appear among their descendants in a bewildering and uncertain, but in a definite and regular order. He crossed peas which differed from each other distinctly in a number of different characters which ran in pairs, as follows:—

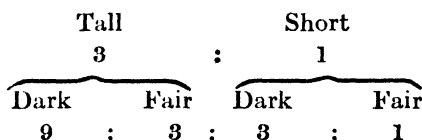
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|----------------------------|---------------------------|
| 1. Round seed | as against wrinkled seed. |
| 2. Yellow albumen | do. green albumen. |
| 3. Grey or brown seed-coat | do. white seed-coat. |
| 4. Simply-inflated pods | do. constricted pods. |
| 5. Green, unripe seeds | do. yellow unripe seeds. |
| 6. Axial flowers | do. terminal flowers. |
| 7. Long stems | do. short stems. |

When he observed the behaviour of the first of these seven pairs of characters, he found that the hybrids or first crosses all had round seeds—none had wrinkled—but that, in the next generation, that is among the progeny of the first crosses, wrinkled seeds re-appeared in such number that they were to the round in the proportion 1 : 3. When he observed the behaviour of the second pair of characters he found similar phenomena. The first crosses all had seed with yellow albumen, but in the next generation, seeds having green albumen reappeared in such number that they were to those having yellow in the proportion 1 : 3. He found, farther, that the distribution of either pair of characters was independent of the distribution of the other. In both the wrinkled and the round groups there were three seeds having yellow albumen to one having green, and in the

groups of those having yellow albumen as well as in those having green there were three round seeds to one wrinkled. Thus, since there were always three round seeds to one wrinkled and three yellow to one green, Mendel found that, when two pairs of characters were taken together, the proportions were 9 round and yellow : 3 round and green : 3 wrinkled and yellow : 1 wrinkled and green. This might be made clearer by a more familiar example. If in a human population there were three tall men to one short and three dark to one fair, there would be four different groups when grouped by two pairs of characters, as indicated in the following diagram :—

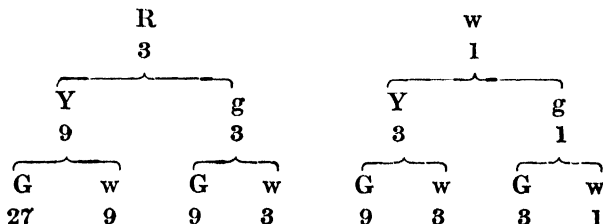


In both the tall and short groups there would be three dark to one fair, but, since there would be three times as many individuals in the tall group as in the short, the proportions, if the population were divided by a second pair of characters, would be as in the fourth line below :—



Mendel's groups of peas were a similar case of a number of individuals being broken first into two groups by one divisor and then into twice as many by a second. We can make the result still clearer by using symbols, and we can also show what the distribution would have been for each successive pair of characters which Mendel dealt with. Mendel called the character which blotted out the other in the first hybrid generation the *dominant* and the character which was blotted out the *recessive*, and he indicated the dominants by capital letters and the recessives by small.

In the following diagram R=round, w=wrinkled; Y=yellow albumen, g=green; G=grey seed-coat, w=white; and so on :—



And so on.

To explain these phenomena Mendel advanced and proved the theory that the male flower in the pollen and the female in the egg

throw off equal numbers of the causes—determinants or factors they are called—which go to make the eventual characters what they are. In the case of the round and wrinkled peas, one parent throws off factors to cause roundness, the other factors to cause wrinkleness, thus :—

One parent	The other parent
.....R	w.....

The progeny must then start off with determinants for both roundness and wrinkledness, and, although, because of the dominance of roundness, they show the round character only, they are really hybrids carrying both kinds of determinants.

Then, when they again came to throw off determinants, both male and female flowers threw off equal numbers of both kinds of determinants, thus :—

Male flower	Female flower
.....R	R.....
.....w	w.....

The factors R and w from either parent have equal chances of mating with either R or w from the other. Consequently equal numbers of seeds in the next generation will start off with the determinants RR, Rw, wR, and ww. The two middle kinds being furnished alike, there are really only three kinds ; but, since the first and middle kinds—RR and Rw—are indistinguishable, there are really three seeds *showing* the character R to one showing the character w : that is, three round to one wrinkled.

If we consider the working of the two pairs of characters, the first crosses throw off the following determinants :—

.....R	R.....
.....w	w.....
.....Y	Y.....
.....g	g.....

Equal numbers of seeds start off with the determinants RR, Rw, wR, and ww. But since the two different pairs of characters are independent, each of these four kinds of seeds RR, Rw, etc., will have equal chances of starting off with the determinants YY, Yg, gY, or gg. Thus among the pure RR group, the following four kinds will be found :—

RR	RR	RR	RR
YY	Yg	gY	gg

And if we extend this distribution of all the YY kinds to all the

RR groups, there are sixteen different combinations possible, as indicated by the following diagram :—

RR	RR	RR	RR
YY	Yg	gY	gg
Rw	Rw	Rw	Rw
YY	Yg	gY	gg
wR	wR	wR	wR
YY	Yg	gY	gg
ww	ww	ww	ww
YY	Yg	gY	gg

Because of the dominance of R and Y, the nine seeds in the left-hand upper division of the diagram will *show* the characters R and Y, the three in the right-hand upper division will *show* the characters R and g, the three in the left-hand lower division will *show* the characters w and Y, and the one left over will *show* the characters w and g. This can be represented more clearly thus :—

R	R	w	w
Y	g	Y	g
9	: 3	: 3	: 1

That is to say, the second crosses from two peas, differing in having round seed and wrinkled and in having yellow albumen and green, should consist of four groups, viz., 9 round and yellow : 3 round and green : 3 wrinkled and yellow : 1 wrinkled and green. They should appear in the proportions in which Mendel actually found them. Thus the theory agrees with and explains the facts.

Having considered so much of the Mendelian theory, in order to understand Dr. Pearl's results, we may now proceed. Among poultry, as among other animals, the sexes are about equal, **endelism** on the average. To account for this the theory **applied** has been established that, while the male is pure **to Poultry.** as regards the factors controlling sex, the female is hybrid. Representing the characters by letters, the female carries Fm and the male mm. The factors thrown off by each sex are therefore—

By the female	By the male
.....F	m.....
.....m	m.....

The two factors thrown off by the female can mate only with the

factor m thrown by the male. Consequently the next generation can start off with either Fm or mm , and, as the factors F and m are thrown off in equal numbers by the female, the number of males and females produced must be equal in number.

Among poultry the two sexes are nearly always readily distinguishable from each other. There are the comb, spurs, size and other things, and frequently there are colours in one sex which are not in the other. There are thus characters which are linked or coupled with one or other of the sexes. Take the comb, by way of example, and let X represent the female comb-character and x the male. If either of these characters is always coupled either with femaleness or maleness, the other is virtually coupled with that for the alternative sex. If, for instance, F and X are inseparable, m and x are virtually inseparable also, and the factorial representation of the sexes and their combs becomes :—

Female	Male
$\begin{bmatrix} F \\ X \end{bmatrix}$	
m	m
x	x

There is an instructive example in the Plymouth Rock breed of fowl. Pure breeds are equally barred in both sexes, yet both sexes do not breed alike when mated with plain coloured fowl. The progeny of male Plymouth Rocks with plain females are all barred ; but the progeny of female Plymouth Rocks with plain males are only half of them barred and half of them plain, with the further complication that the barred progeny are all males and the plain progeny females. Since the male Plymouth Rocks all breed alike, they are pure so far as barring is concerned, and since their progeny are all barred, barring is dominant to plainness. The constitution of the male Plymouth Rocks, so far as sex and barring are concerned,

is therefore $\begin{smallmatrix} m & m \\ B & B \end{smallmatrix}$. This being so, the female Plymouth Rocks must

always receive from their male parents the factors m and B , and from their female parents the factor F . But since they produce plain progeny, they must also carry the factor p , and their constitution

must therefore be $\begin{smallmatrix} Fm \\ pB \end{smallmatrix}$. The only possible explanation of the females

producing plain progeny, although they are constantly mated with males carrying BB , is that either F and p or m and B are coupled. There are many breeds, however, in which the males are plain ; consequently m and B are not coupled. The coupling of F and p is therefore not exclusive so far as p is concerned since p can be associated with m , but it is exclusive so far as F is concerned. F is not accompanied by any other factor than p . The differences

between the progeny of male and female Plymouth Rocks with plain birds is thus explained, for, in the mating of barred females, $\begin{bmatrix} F \\ p \end{bmatrix}^m_B$

with plain males, $\begin{smallmatrix} m & m \\ p & p \end{smallmatrix}$, the coupling of F and p virtually couples m and B. Consequently there are practically only two mateable factors in the female, viz., $\begin{bmatrix} F \\ p \end{bmatrix}$ and mB, and these having only mp to mate with in the males, there can only be produced in their progeny $\begin{bmatrix} F \\ p \end{bmatrix}^m_p$ and $\begin{smallmatrix} m & m \\ B & p \end{smallmatrix}$. The former are plain females and the latter barred males.

On the other hand, in the mating of plain females, $\begin{bmatrix} F \\ p \end{bmatrix}^m_p$, and barred males $\begin{smallmatrix} mm \\ BB \end{smallmatrix}$, the coupled factors $\begin{bmatrix} F \\ p \end{bmatrix}$ as well as the virtually coupled factors mp can mate only with the factors mB, and thus there are produced in the next generation equal numbers carrying $\begin{bmatrix} F \\ p \end{bmatrix}^m_B$ and $\begin{smallmatrix} mm \\ pB \end{smallmatrix}$; the former being barred females and the latter barred males.

In view of what has yet to be said about the heredity of egg-laying, it ought to be kept in mind that barred Plymouth Rock females do not have barred daughters unless they be mated with barred males. Thus barred daughters are barred, not through what they get from their dams, but through what they get from their sires, and, since barring is virtually coupled with the male factor

in the female—viz., $\begin{bmatrix} F \\ p \end{bmatrix}^m_B$ —barred female Plymouth Rocks can

hand on barring to their sons only. $\begin{bmatrix} F \\ p \end{bmatrix}^m_B \times \begin{smallmatrix} mm \\ pp \end{smallmatrix}$ gives $\begin{bmatrix} F \\ p \end{bmatrix}^m_p$ and $\begin{smallmatrix} mm \\ Bp \end{smallmatrix}$ only. In egg-laying the hereditary mechanism is similar.

Before discussing the heredity of egg-laying, it ought to be mentioned that Dr. Pearl found it necessary to find out how to determine a hen's egg-laying powers without waiting till she had laid for a whole year. By so doing he hoped to save time and also to make statistical use of those hens that might eventually break down, before they had broken down. And he found the test to lie in the number of eggs laid during a hen's first winter period, approximately from autumn till the end of February. The number of eggs a hen lays during this period is an

**Test of
Egg-laying
Capacity.**

indication of the number she will lay during the whole year. Dr. Pearl found that his poultry fell into three rough grades, viz., those that laid no eggs in winter, those that laid less than thirty, and those that laid more than thirty; and this finding, with the exception that the boundary figure ought perhaps to be slightly over thirty, can be confirmed from the egg-laying competition held at the Munster Institute in 1912-13, the results of which were published in the issue of this JOURNAL for October last. If Dr. Pearl's figures and dates be taken as approximate, it will be found from the Munster report that there are three rough grades of hens, viz., (1) hens which lay no eggs at all during the winter period but start only in the beginning of spring, (2) hens laying under 30 eggs during the same winter period—the average over all being about 18 or 20—and (3) hens laying over about 30 eggs, with an average over all of about 50 or 60. The first of these lays less than 40 or 50 eggs during a whole year, the second between about 50 and 100, with an average of about 75, and the third from 100 to 200 eggs, with an average of about 150 or more. It must be remembered that these figures and dates are all very elastic, for fowl, like cows or other animals, are readily influenced by such factors as food, temperature, shelter, bad health or discomfort. These and similar causes may interfere at any time to alter a fowl's productivity.

In the production of these three grades of hens, Dr. Pearl found two pairs of factors operating. He found that the two recessive factors were concurrent with the production of no eggs in the winter season, that when either dominant was present under 30 eggs were produced, and that when both dominants were present over 30 eggs were produced. A diagram will make his results clearer:—

X	X	x	x
Y	y	Y	y
over 30	under 30	under 30	none.

But Dr. Pearl found in addition that one of the recessive factors was coupled with femaleness, and that in consequence every good laying hen must always hand on a low-laying factor to her daughters. If we call x the coupled factor, then the following are the only constitutions which hens can carry:—

$\begin{array}{|c|} \hline F^m \\ \hline x \\ \hline \end{array}$	$\begin{array}{|c|} \hline F^m \\ \hline x \\ \hline \end{array}$	$\begin{array}{|c|} \hline F^m \\ \hline x \\ \hline \end{array}$	$\begin{array}{|c|} \hline F^m \\ \hline x \\ \hline \end{array}$	$\begin{array}{|c|} \hline F^m \\ \hline x \\ \hline \end{array}$	$\begin{array}{|c|} \hline F^m \\ \hline x \\ \hline \end{array}$
X	X	X	x	x	x
Y Y	Y y	y y	Y Y	Y y	y y
laying	laying	laying	laying	laying	laying
over	over	under	under	under	none
30	30	30	30	30	

But because of the coupling of F and x, no hen can hand on the factor X to her daughters. She can do so to her sons only. Thus the secret of producing high-laying hens only in every generation lies in breeding only from males carrying the factors for high-laying pure, i.e., XX YY. The breeder's problem is, therefore, first to identify one or more XX YY males and afterwards breed similar males from them. And, as the characteristic of a pure highest-grade male is that all his daughters are maximum grade layers, such a male is only identified when among a reasonable number of daughters—say ten or twelve at least—none is found below the highest grade.

But with what kind of hen is the high grade male to be mated? As it would be sheer waste to mate him with either the lowest or the medium grade so long as females of the highest

Mating. grade were to be found, there is not the least doubt as to what should be done. Unfortunately complication arises from the fact that there are two kinds of hen laying the highest number of eggs. There is one of the constitution $\begin{array}{|c|} \hline F \\ \hline x \\ \hline \end{array} \begin{array}{l} m \\ X \\ Y \end{array}$

and another of the constitution $\begin{array}{|c|} \hline F \\ \hline x \\ \hline Y \\ \hline \end{array} \begin{array}{l} m \\ X \\ y \end{array}$. The former we will call the

pure and the latter the impure highest-grade hen. The former's progeny by a pure highest-grade cock will all be pure, while of the latter's progeny only a half will be pure.

The breeder has two options, viz. : (1) To mate a highest-grade cock with a number of highest grade hens without endeavouring to distinguish the impure hens from the pure. If the descendants of such a stock of hens be mated in every successive generation with highest-grade cocks only, the proportion of pure highest-grade birds of both sexes will gradually increase until eventually all are pure, but no one can say when that stage will arrive; and, until it does arrive, the stock will continue to throw impure birds of both sexes. For some generations, no bird can be guaranteed of the highest grade and pure, and even then only after an exhaustive inspection and possibly a troublesome test. (2) To identify the hens of highest-laying grade that are pure and mate them with a highest-grade cock. In this case the progeny of both sexes are all of highest grade and pure. The initial trouble is to identify the pure highest-grade hens. This can be done in two ways:—

(a) If a number of highest-grade hens be mated with a male known to be of the bottom grade, the pure hens could be separated from the impure by the performances of their daughters.

Pure Hens. The former's daughters should all be medium grade while some of the latter's should be bottom

grade. The former should all lay eggs during their first winter, while some of the latter should lay none.

(b) If a number of highest-grade hens be mated with a highest-grade cock, the pure and the impure could be distinguished through their son's daughters. Mated with the lowest grade of hen, the sons of pure mothers would get highest grade daughters only, while the sons of impure mothers would get some medium-grade daughters.

In connection with this subject it is worth mentioning that the Munster Institute competition of last year has shown that high-laying powers are not confined to the so-called "laying" breeds. A pen of Red Sussex birds was second in the competition. High-laying powers and high table qualities may be found, and no doubt are found frequently, in the same animal. It may also be mentioned that so long as the originally selected parents are strong and healthy, there need be no fear of in-breeding.

EARLY IDENTIFICATION OF THE GOOD HENS.

In connection with the foregoing paper, there has to be recorded a very important observation made by Miss Murphy, who is in charge of the poultry work at the Munster Institute. About a year ago, she found that a hen's total yield for the year could be predicted approximately from her yield a few weeks after she had begun to lay. It was decided to wait, however, till the end of the year's egg-laying competition before any statement should be made so that the original observation might be confirmed. The observation was that the good pullets which are old enough to start laying in winter lay at the rate of about five eggs in the week for the first two months and that seldom is there more than one blank day at a time.

A glance at the following diagram will show this. It contains the records of 24 hens—eight very good, eight medium, and eight poor layers. It will be noticed that the good layers have blanks of only one day at a time as a rule, and that this rate is kept up for eight or ten weeks at least; it will be noticed that the medium layers have blanks of several days at a time, and if not, lay for a few weeks only; and that the poor layers lay no eggs at all, or only a very few. It must be remembered, that these records are from mature pullets which were well fed and cared for.

The great value of the observation lies in this, that the breeder knows before the setting season begins the grades to which his pullets belong and he can infer therefrom the parents' grades in some cases.

[illegible]

Yw [see p. 240.]

* The Numbers given are the Numbers distinguishing the Birds in the First Irish Egg-Laying Competition held at the Munster Institute, Cork, 1912-1913.

THE DISPOSAL OF CREAMERY REFUSE.

By A. POOLE WILSON, Department of Agriculture and Technical Instruction for Ireland.

Creamery refuse consists mainly of the milk, cream, separated milk and buttermilk which has been accidentally spilled in handling on creamery premises, the washings from butter when in the granular stage in the churn, and water utilised in cleansing the creamery and the numerous utensils.

When fresh the refuse is a milky looking liquid without any objectionable smell. It is however highly putrescible and if precautions are not taken in its disposal, it is likely to give off a very objectionable smell, or if discharged into a small stream or river it may pollute it to such an extent as to render the stream foul, unsightly, and a nuisance.

It is gradually being realized that it is now possible to avoid the nuisance arising from decomposing refuse or to abate the pollution of streams. Consequently complaints of nuisance or pollution arising out of the discharge of such trade refuse are becoming more frequent, and undoubtedly many creamery proprietors will have to face the problem of purifying the refuse in the near future. People who tolerated the nuisance or pollution for fear of destroying a nascent industry are now complaining as they become aware of the fact that the matter can be remedied.

Promoters of a creamery should see that there are natural facilities for satisfactorily disposing of, or for purifying, the refuse at a minimum outlay before definitely selecting a site. Attention has been directed to this, amongst other matters, in the Department's Leaflet "A.B. Memo. No. 15, Creamery Buildings." The instructors in dairying when called on to advise in the selection of a site for a creamery also call the attention of the promoters to this point.

The provisions of the Public Health Acts can be utilised to compel the abatement of a nuisance, and the provisions of the Rivers' Pollution Act to prevent the discharge of the untreated trade refuse into a stream or river.

Many creamery owners have already been penalised on account of nuisance, or pollution. In the latter case the practice of conveying the refuse by pipes beyond the complainants' land has been followed, forgetful of the fact that this does not diminish the pollution but merely alters the location.

Since 1893 various attempts have been made to purify the refuse. It is worth while examining the unsuccessful methods in order to avoid mistakes in the future.

Filtration of the refuse through sand, dried peat, clinkers, or ashes proved a failure, the refuse choking the material in a few days and the effluent in all cases being nearly as bad as the original refuse.

Filtration.

Precipitation of the suspended matter in the refuse by means of lime, or lime with the addition of various salts of

Precipitation. Iron or Alumina, or any of the numerous patented materials which were and are on sale for the purpose, proved a failure. Though the effluent was in several cases clarified, it was still highly putrescible and occasioned almost as much trouble as the original refuse. Further, the removal of the sludge from the precipitation tanks involved a great deal of labour and generally gave rise to a nuisance. The cost of the various mixtures used and the trouble in adding them involved expense and also entailed constant supervision.

Oxidation of the sewage by the aid of bacteria and compounds of manganese proved unsatisfactory and too costly.

•

In a few cases "broad irrigation" was tried and proved successful. Where the land available was restricted willow growing was also adopted in order to assist in absorbing the moisture.

Irrigation.

In 1902 the Department commenced experiments with the object of finding a satisfactory method of purifying the refuse from creameries where, for various reasons, irrigation was not possible. This experiment is described in the Department's JOURNAL, Vol. IV., No. 3, page 511. The method devised has since stood the test of time. In all cases based on this method where the plans were properly carried out purification of the sewage to a satisfactory extent has been attained. The method is applicable in the case of a small cream separating station with a few hundred gallons of refuse per day as well as in the case of a large creamery with several thousand gallons per day. Further, the same principle of purification has since been adopted in America and on the Continent with equally satisfactory results.

Experiments by the Department.

Before however entering into details it is necessary to know the quantity of refuse which has to be purified. Unfortunately our maximum daily supply of milk, with the consequent maximum flow of refuse occurs in the summer months when our streams are at their lowest.

An effluent, which might be sufficiently purified to discharge into a stream during the winter without any bad effect on the condition or appearance of the stream, may have to be more highly purified during the summer months when the stream is much lower.

The maximum flow and maximum degree of purification have thus to be faced at the same time.

It is a difficult matter to estimate the quantity correctly. The refuse includes :—

- Quantity of Refuse.** • I. Rainwater from roofs and the clean water used for cooling milk, cream, separated milk, or the condenser of a refrigerating machine.
 II. Water used in washing down the premises.
 III. The drainage and washings from the various machines and utensils in use and from the roadway.

The rain water and clean water can easily be separated from the other portions and discharged without any treatment.

The quantity of water used in cleaning the premises will depend on their construction. A badly designed, or congested, creamery may easily require two or three times as much water for cleaning purposes as is required in a roomy, well designed place. All this water is soiled and forms part of the refuse.

Excluding the clean water it has been found that the quantity of refuse varies from one-third to five-sixths of the total quantity of milk treated directly, or indirectly, at the premises.

A rough method of making an estimation can be based on the following :—

	Gallons of Refuse per 1,000 gals. of Milk.
Receiving and separation of the milk and cleaning will yield	800
Churning, washing of butter, cleaning churns, cream vats, etc.	500

Thus a creamery receiving 2,500 gallons of milk on any one day may expect to have 2,000 gallons of refuse. A creamery receiving 2,000 gallons of milk and the cream from 3,000 gallons of milk separated at cream separating stations may expect to have from the milk 1,600 gallons of refuse and from the cream 1,500 gallons or a total of 3,100 gallons of refuse.

All this it must be remembered is discharged within a few hours.

As regards liability to putrefy, town sewage is easily managed as compared with creamery refuse, which is one of the most difficult if not the most difficult trade effluent to purify. The most putrescible portion of the refuse is the first washings of the granular butter in the churn, next the rinsings and water used in cleaning the separated milk and buttermilk tanks. If whey from cheese or casein manufacture is wasted it further complicates matters. At one creamery the first washing of the butter in the churn is pumped into a special tank, allowed to settle, the greater part of the semi-transparent liquid discharged into the drain and the thicker curdy portion given away for pig-feeding.

The only two methods which have so far met with success in disposing of creamery refuse are :—

Successful Methods of Disposal.

- I. Irrigation,
- II. Septic tank treatment.

Where the requisite ground can be obtained or utilised at a reasonable cost, is suitable in character, and is at a sufficient distance from any public roads or residential houses, broad irrigation offers the simplest way of disposing of the refuse. At the same time the manurial matter in the refuse is utilised.

The ground must not be of a stiff clay, the most suitable being a medium soil with a sandy or gravelly subsoil. Heavy loams and clay are apt to crack in dry weather and the refuse runs away without treatment, especially if the land is underdrained.

A soil into which the refuse will gradually percolate and follow the natural course of drainage is required. A depth of about 3 feet of soil and subsoil is desirable.

Successful results have been obtained by turning the refuse on to meadows having a slight fall. The refuse being run on one portion to-day and another to-morrow and so on; each portion of the land being given a rest; one meadow being utilised while the other is being cut and saved.

The area of land required will vary with the soil. An acre of good suitable land will take 20,000 gallons per day, while on stiff land this quantity may fall to 2,000 gallons per day. The land may be under-drained provided it does not crack in dry weather and that care is taken that the refuse is not run directly over a drain.

Rye grass, mangels, and cabbage, are the crops which are most suitable where large quantities of liquid are applied. Willow growing was tried in order to reduce the smell on one plot but was only a partial success. The ground requiring attention was also difficult of access owing to the dense growth.

Where permanent pasture is utilised and the ground is not sufficiently porous, pools of decomposing refuse form, especially in wet weather, and a smell rises which is carried considerable distances by wind. If the refuse is not well distributed large burnt patches will appear where it is discharged.

If the levels are not suited for delivery of the refuse by gravitation a small collecting tank and pump may have to be installed. The interior of this tank must be quite smooth and the bottom have a fall to the end of the suction pipe. The tank should be thoroughly cleaned out daily or it quickly becomes a nuisance.

The pump should not be placed over the tank but where any drip will be caught and returned to the drain or tank. The pump should also be of ample capacity and have an extra large delivery pipe to avoid friction.

When selecting land for irrigation purposes or for a purification plant the direction of the prevailing winds should **Prevailing Winds.** always be taken into consideration, so that if at any time a smell does arise it will be blown generally in the direction where it will give least cause of complaint.

The septic tank system of purifying creamery refuse is suited for places where the ground available for the purpose of irrigation is too costly, too limited in area, or unsuitable in position or character.

The purification is effected in stages and can be carried to any degree. An effluent can be obtained which will not give rise to the unsightly algal growths even when discharged into a small stream. These grey spongy growths are always symptomatic of pollution and the greater the distance they continue in the stream from the point of discharge the greater the pollution.

The principle underlying the septic tank system of purification, is bacterial action. Instead of this action taking place in the soil, as in irrigation methods, the action takes place in tanks or bacterial beds.

This method has been successfully used for town sewage for some considerable time. It, however, required modification before it was found suitable for creamery sewage. This modification was first introduced by the Department in 1902, and has proved satisfactory up to the present time.

In working out details the Department took into consideration the following requirements :—

- (a) The cost of the plant should be kept as low as possible.
- (b) The cost of working should be low.
- (c) The attention required should be such as can be given by the staff at the creamery.
- (d) There should be no intricate plant liable to get out of order.

For creameries with less than 3,000 gallons of refuse per day it is in most cases possible to dispense with the expensive automatic devices. When more than the above quantity has to be dealt with then the use of automatic devices may be an economy.

The plant necessary will depend on the degree of purification aimed at. It may be that a septic tank alone will suffice. If further purification is required then a bacterial bed must be added, and should a higher standard of purity be called for a second or even a third bacterial bed may be necessary. More than two bacterial beds however have not been so far found necessary in any case.

The septic tank may be open or closed. If the site is so far from the creamery, and from any public roads or houses, **The Tank.** that a nuisance will not be caused by the smell from the decomposing refuse, there is no necessity to cover the tank. In one case an old gravel pit was utilised as an open septic tank.

While not recommending the practice, a covered septic tank has been in operation for several years within a few yards of a creamery but where possible the tank should be at least 100 yards from the premises.

Site. In choosing a site the direction of the prevailing winds must be considered.

The tank may be merely an excavation in the ground, provided the ground is of such a nature that leakage will not take place, or that any slight leakage that may take place will not give rise to a nuisance, or interfere with the proper working of the plant. Or the interior of the tank may be lined with clay well puddled and then faced with brickwork or dry rubble masonry. On the other hand it may be necessary to construct the tank of good concrete, well rammed, and the interior finished off with strong cement plaster. This is especially the case when the tank is above the ground level, as even the smallest leak then causes a nuisance.

The capacity of the septic tank required depends on the quality of the refuse. It should be at least capable of holding five days' maximum flow in the case of a cream-separating station, at least seven days' maximum flow for a creamery without separating stations, and at least ten days' flow in case of a large creamery with separating stations.

The tank should preferably be long and narrow, the most satisfactory dimensions so far tried being 6 feet wide by 6 to 7 feet deep to the water line and of sufficient length to give the required capacity. A rectangular tank divided in three in the direction of its length is the most compact and economical way of obtaining the required length, the liquid moving through dip pipes made of ordinary sewer piping from one division to the next. The sides of the tank should be carried up about 18 inches above the water line to allow for the thick scum which floats on top and to hold up one day's flow of sewage if found necessary.

If the tank is long and straight, scum boards made of 9 inch by 3 inch planking should be placed across the tank at intervals and dip about one foot below the surface.

A tank 45 feet long by 20 feet wide with two divisions will hold a ten days accumulation of refuse from a creamery discharging 3,000 gallons per day. If no further treatment is to be given, the last ten feet of the septic tank near the outlet should be filled with limestone the size of road metal. This has the effect of neutralizing to some extent the acidity of the effluent.

The discharge should be through a good sewage valve so that if necessary the refuse can be held up or the out-flow regulated.

Sludge. The scum and sludge which gradually accumulate in the septic tank have to be emptied once each year. It is therefore advisable to give the bottom a fall to the outlet and fix in a good sewage valve of ample dimensions. During the winter months, when the work at the creamery is light, the liquid portion of the contents should be pumped out, the scum and sludge being run or swept out to the sludge pit. This latter pit may be merely an excavation in the ground. The sludge may then be deodorised with a little chloride of lime, covered with earth and left till summer, when the contents of the pit will have nearly dried and can then be carted away for manure.

If a concrete septic tank has been constructed, the first division only may require emptying annually, the other divisions every second or third year, according to their condition.

Where the removal of the sludge cannot be effected by gravitation then a chain pump, with the whole of the head and chain above the level of tank enclosed to avoid splashing, may be utilised.

If this work is well managed no nuisance need arise while it is being carried out.

While in theory the whole of the matter in creamery refuse should be decomposed and disappear, in practice sludge always accumulates.

Where a tank has to be covered, 9 inch by 3 inch planks, well creosoted, and then covered with six inches of earth, have been found quite effective. No smell has ever been detected under these circumstances.

Covering the Tank.

The effluent from the septic tank is slightly opalescent in appearance and has a strong smell. Compared with

Effluent from the original sewage a purification of 80 to 90 per cent. will have been effected. The smell can be reduced or eliminated by adding a 1 per

Septic Tank. cent. solution of chloride of lime at the rate of $\frac{1}{4}$ th ounce to the gallon of effluent. A stronger solution or more than the above quantity must not be used. An old 40 gallon oil barrel, cleaned and fitted with a glass syphon, rubber end, and pinch cock, is a ready way of adding the solution. The odour also disappears if the effluent is passed through a small covered collecting tank or a contact bed.

To obtain further purification the effluent from the septic tank must be passed through a bacterial bed.

Bacterial Beds. terial beds may be of two kinds, contact or percolating.

A contact bacterial bed consists of a tank or excavation filled with a hard material, fairly uniform in size, but of varying degrees of fineness, according to the circumstances. The effluent from the

septic tank is run into the bed, allowed to remain for a period, varying in length in each case, in contact with the material in the bed, and then discharged. The bed is drained and aerated in the interval between the charges. The thorough drainage, rest and aeration of the bed are essential and must not be omitted. Purification in these beds is effected by the bacteria which find a resting place on the surface of the material used in the beds and by the action of the oxygen from the atmosphere which may be trapped amongst the material of the bed during filling.

A percolating bacterial bed contains material similar to that used in the contact bed, and held together by a wall of dry rubble masonry. The effluent from the septic tank is spread over the surface by a mechanical distributor, percolates through the material of the bed and drains away. The sides of the bed are open and the liquid is not held in contact. These beds are however made much deeper than contact beds. This type is not suitable for an effluent having a strong smell, as the spraying of the liquid on the bed distributes the odour widely, especially if there is any wind.

For the primary bacterial bed it is advisable to adopt the contact type. This bed may be merely an excavation of the ground if suitable or the interior may be faced with clay and dry rubble masonry. If above the ground level it must be of concrete and watertight.

The capacity of the bed where automatic devices are not used must be equal to the maximum daily flow of sewage.

The most suitable material for filling purposes is broken limestone as it helps to neutralize the acidity of the septic tank effluent. Gravel, hard clinkers, or any hard material may be used.

The material for the bed should be broken to $\frac{1}{4}$ inch to $\frac{3}{4}$ inch gauge, the finer or coarser particles being screened out. The screened chippings from a stone breaker are very suitable and generally easy to obtain.

A layer of drains, to facilitate drainage and aeration, should be placed in the bed, with a fall to the outlet, and then the material filled in to the water line and six inches above it.

The effluent from the septic tank should be delivered through pipes to the bottom of the contact bed in order to avoid distribution of any odour by violent disturbance of the liquid.

A good sewage valve of ample dimensions should be fixed on outlet.

This bed will last for some years without disturbance. It should then be emptied, and the material screened and put back with any additional new material required to bring it above the water level.

A bed 20 feet by 20 feet by 4 feet will hold 3,000 gallons when filled to the water line at a depth of 3 feet 6 inches.

If further purification is required a second bed, made precisely as the first, but filled with material of a finer gauge,
Secondary Bed. say $\frac{1}{8}$ th inch to $\frac{1}{2}$ inch, if it can be obtained.

A third bed can be added if necessary. So far no automatic devices have been used and the method of working the plant is as follows :—

Once the septic tank is full, each day's refuse as it flows in will displace an equal quantity of the effluent which is collected during the day in the first contact bed, the outlet valve having been closed first thing in the morning by the fireman. In the evening the liquid which has collected in the first bed is discharged into the second bed and held there over night, being let off in the early morning.

All the attention required is to open one valve and close another, morning and evening. An increase in the number of beds merely involves an extra valve to turn morning and evening for each bed.

Instead, however, of a second contact bed a percolating bed with a revolving sprinkler may be introduced and is
Percolating Bed more efficient. There is not likely to be any
in place of Second danger of nuisance arising in the case of the second
Contact Bed. bed being of the percolating type. The extra
 cost of the distributor is to some extent met by a
 saving in side walls and foundations.

Creameries having more than 3,000 gallons of sewage per day are recommended to adopt the use of automatic syphons and distributors.

The septic tank in these cases must be of ample capacity and be made so that, although the refuse comes down in a few hours, the effluent can be delivered over a period of about 18 to 20 hours out of the 24. Smaller contact and percolating beds can then be used but they must be in duplicate. The automatic devices first fill one contact bed and then the other and deliver the contents automatically after intervals, for which the syphons are set, to the next beds and then discharge the contents. In designing a plant of this kind care must be exercised in the selection of the automatic syphons and distributors. Some types of syphons have proved very troublesome,

as have also some of the distributors, although in dealing with ordinary town sewage they worked successfully.

The cost of purifying the refuse from a creamery cannot be estimated without a study of each particular case.

Cost of Schemes. Where mechanical devices have not been used the cost has ranged from £50 to £400, according to the quantity to be dealt with and the special circumstances of each case. When mechanical devices are utilised the cost of these may range from £30 to £300, in addition to the cost of the tanks.

Whatever the cost, it is the annual charges for interest on capital, depreciation, and running expenses which have to be considered. The running expenses in a well arranged plant are small, little attention being required. Although it may be rather startling at first sight, it is just as important to get rid of the refuse as to have a good water supply at a creamery. In the past neither of these matters has received the attention it deserved.

It is also important that a purification plant when installed should be looked after or it may give trouble. The tendency is to neglect the matter and let things drift till faced by an injunction or a civil action. Then hurried action is often taken and the work badly designed, or badly carried out.

In cases of difficulty skilled advice from those having experience of plants designed for creamery refuse should be sought.

Instructions should also be sought as to the proper method of taking samples of refuse, effluents, and of the waters of the rivers or streams into which they may be discharged, at points above the place of discharge and after thorough admixture of the discharge with the river or stream has taken place.

Appended is the summary of conclusions from the Eighth Report of the Commissioners appointed to inquire and report what methods of Treating and Disposing of Sewage (including any Liquid from any Factory or Manufacturing Process) may properly be adopted.

SUMMARY OF CONCLUSIONS.

(a) The law should be altered so that a person discharging sewage matter into a stream should not be deemed to have committed an offence under the Rivers Pollution Prevention Act, 1876, if the sewage matter is discharged in a form which satisfies the requirements of the prescribed standard.

(b) The standard should be either the general standard or a special standard which will be higher or lower than the general standard as local circumstances require or permit.

(c) An effluent, in order to comply with the general standard, must not contain, as discharged, more than 3 parts per 100,000 of suspended matter, and with its suspended matters included must not take up at 65° F. (18·3° C.) more than 2·0 parts per 100,000 of dissolved oxygen in 5 days. This general standard should be prescribed either by Statute or by Order of the Central Authority, and should be subject to modifications by that Authority after an interval of not less than ten years.

(d) In fixing any special standard the dilution afforded by the stream is the chief factor to be considered. If the dilution is very low it may be necessary for the Central Authority, either on their own initiative or on application by the Rivers Board, to prescribe a specially stringent standard, which should also remain in force for a period of not less than ten years.

(e) If the dilution is very great the standard may, with the approval of the Central Authority, be relaxed or suspended altogether. Our experience leads us to think that as a general rule, if the dilution, while not falling below 150 volumes, does not exceed 300, the dissolved oxygen absorption test may be omitted, and the standard for suspended solids fixed at 6 parts per 100,000. To comply with this test no treatment beyond chemical precipitation would ordinarily be needed. If the dilution while not falling below 300 volumes does not exceed 500 the standard for suspended solids may be further relaxed to 15 parts per 100,000. For this purpose tank treatment without chemicals would generally suffice if the tanks were properly worked and regularly cleansed. These relaxed standards should be subject to revision at periods to be fixed by the Central Authority, and the periods should be shorter than those prescribed for the general or for the more stringent standards.

(f) With a dilution of over 500 volumes all tests might be dispensed with, and crude sewage discharged, subject to such conditions as to the provision of screens or detritus tanks as might appear necessary to the Central Authority.

FIELD EXPERIMENTS, 1913.

I.—BARLEY.

The field experiments in the cultivation of barley conducted this season were a repetition of those of 1912, the object of which was to test the value of two selections of Archer raised by the Department, and a hybrid barley obtained by Mr. E. S. Beaven, Warminster, by crossing an Archer with a broad-eared barley of the Goldthorpe type.

This barley represents an attempt to combine the form of ear and other characters of Goldthorpe with the shorter "necked" straw found in Archer, and by so doing it was thought possible to avoid the loss incidental to most broad-eared barleys by ears breaking off the straw.

The results of last year's trials showed that only a very small difference existed between the three varieties in point of yield, but in quality Beaven's hybrid "145" was distinctly the best.

The experiments in 1913 were conducted at two centres, one in County Kildare and the other in County Louth. The three varieties were sown in duplicate acre plots at both centres.

The average results are shown in the following Table :—

Variety.	Average yield of Good Corn per Statute Acre.		Average value of Good Corn per Statute Acre.		Per- centage of Screen- ings.	Average Total value with Screenings.	
	Brls.	Stns.	£	s. d.	%	£	s. d.
Irish Archer 1 .	11	9	8	16 8	1	8	17 9
Irish Archer 2 .	11	7	8	14 10	1	8	16 1
Beaven's "145" .	11	5	8	12 4	1	8	13 5

As in 1912, the differences in yield of the three varieties are very small, whilst this year those in quality are insufficient to allow of a discrimination in value.

Archer 2 exhibits a slightly earlier ripening habit than Archer 1, whilst Beaven's "145" in both 1912 and 1913 exhibited an immunity to loss by ears breaking off the straw which renders it a particularly valuable variety for districts where broad-eared barleys are grown.

The results of the field experiments of this year and of 1912 have received considerable corroboration from a series of small scale experiments conducted in the Cereal Cage at Ballinacurra. The figures obtained therefrom are not yet sufficiently complete to publish, but the general trend of the conclusions is in accord with those deduced from the field trials commented upon above.

The following Table shows at each centre, the character of the soil and subsoil, and its previous treatment :—

Centre.	Experimenter.	Character of Soil and Subsoil.	Previous Treatment of Land.
1. Carlingford, Co. Louth.	J. P. Kearney.	Good drift loam. Subsoil—gravel and yellow clay.	1911, Oats. 1912, Turnips.
2. Magney, Co. Kildare.	R. K. Wright.	Heavy loam. Subsoil—yellow clay and gravel.	1911, Lea. 1912, Lea.

Character of Season, 1913.

From shortly after sowing until harvest, the season of 1913 was one of the driest experienced for a number of years. The early portion of the year was very wet and sowing was impossible until April, and then generally done under unfavourable conditions. May was a wet month and the appearance of corn at the beginning of June did not give promise of good crops. June, July and August were wonderfully dry months, but there were occasional light showers during the time the grain was filling, which proved extremely beneficial.

In most districts harvesting operations were favoured with fine weather, but threshing was considerably delayed by heavy rains in October, during which period the grain deteriorated greatly in condition.

While the yield of barley in 1913 was a good average, it showed unusual variation between districts. The grain was well filled and of excellent quality, and the proportion of second corn this year was consequently very small.

The Department desire to express their thanks to Messrs. A. Guinness, Son & Co., Ltd., and Mr. J. H. Bennett, Ballinacurra, Co. Cork, who undertook the valuation of the plot samples, and for other technical assistance.

TABLE SHOWING THE YIELD AND VALUE

Name and Address of Experimenter.	Date Sown.	Irish Archer 1.			
		Date Reaped.	Yield per Statute Acre.	Value.	
				Per Brl.	Per Acre.
1. (a) J. P. Kearney Wilvill, Carlingford, Co. Louth; Screenings, . . .	April 2nd	August 26th	Brls. Sts. 10 6 0 0	s. d. 15 6	£ s. d. 8 0 10
Total, . . .			10 6		8 0 10
(b) Screenings, . . .	"	"	13 3 0 0	15 6	10 4 5
Total, . . .			13 3		10 4 5
2. (a) R. K. Wright, Kilkea, Mageney, Co. Kildare Screenings, . . .	April 4th	August 28th	12 0 0 3 12 3	15 0 12 0	9 0 0 0 2 3 9 2 3
Total, . . .					
(b) Screenings, . . .	"	"	10 12 0 3	15 0 12 0	8 1 3 0 2 3
Total, . . .			10 15		8 3 6

NOTE I.—All samples have been valued as delivered in Dublin.

NOTE II.—The Screenings have been valued throughout at 12s. per Barrel.

FOR EACH EXPERIMENTAL PLOT, 1913.

Irish Archer 2.				Beaven's "145."			
Date Reaped.	Yield per Statute Acre.	Value.		Date Reaped.	Yield per Statute Acre.	Value.	
		Per Brl.	Per Acre.			Per Brl.	Per Acre.
Aug. 26th	Brls. Sts.	s. d.	£ s. d.	Aug. 26th	Brls. Sts.	s. d.	£ s. d.
	11 1	15 6	8 11 6		11 7	15 6	8 17 3
	0 0				0 0		
	11 1		8 11 6		11 7		8 17 3
„	12 11 0 0	15 6	9 16 8	„	13 2 0 0	15 0	10 3 5
	12 11		9 16 8		13 2		10 3 5
August 28th	11 11	15 0	8 15 4	August 28th	10 14	15 0	8 3 2
	0 3	12 0	0 2 3		0 3	12 0	0 2 3
	11 14		8 17 7		11 1		8 5 5
„	10 6 0 4	15 0 12 0	7 15 8 0 3 0	„	9 11 0 3	15 0 12 0	7 5 4 0 2 3
	10 10		7 18 8		9 14		7 7 7

II.—MEADOW HAY.

A.—MANURIAL TEST (OLD SERIES).

This series of experiments on the manuring of meadow hay was commenced in 1901 in order to ascertain:—

- I. The increase in yield produced by the application of artificial manures as compared with that obtained from a moderate dressing of farm-yard manure.
- II. The effects of applying complete and incomplete dressings of artificial manures.

The experiments were terminated in 1913 after having been carried out during thirteen consecutive seasons at 217 centres distributed throughout every county in Ireland.

The experiments have generally been conducted on permanent meadow land of average quality such as might be expected to respond to the judicious application of manures.

In view of these facts, therefore, it may be claimed that the results show, in a most convincing manner, the returns that may be expected, under the conditions mentioned, from the various manurial dressings included in the tests.

The manuring of meadow hay on a few particular types of soils, the requirements of which may be expected to differ somewhat from the average, is worthy of further investigation. The Department have already carried out some preliminary experiments on peaty soils, the results of which are given on pages 261 and 262.

Reports showing detailed results of the Old Series of experiments have been published annually in the Department's JOURNAL and also in the reports issued each year by the various County Committees of Agriculture.

The principal results of the complete series are given concisely as follows:—

TABLE showing the General Average Results of 217 Experiments carried out during the years 1901-1913, inclusive:—

Year.	Number of Experiments.	Plot 1. No Manure.	Plot 2. 10 tons Farm-yard Manure.	Plot 3. 1 cwt. Nitrate of Soda.	Plot 4. 1 cwt. Nitrate of Soda, 2 cwt. Super-phosphate.	Plot 5. 1 cwt. Nitrate of Soda, 2 cwt. Super-phosphate, 2 cwt. Kainit.
Average yield per Statute Acre.						
		C. Q.	C. Q.	C. Q.	C. Q.	C. Q.
1901	10	28 2	38 2	36 3	45 0	48 3
1902	8	29 1	39 2	34 3	40 2	46 2
1903	27	29 0	41 2	35 0	42 2	47 2
1904	16	28 1	39 3	33 2	39 0	43 3
1905	22	31 1	40 0	38 3	42 1	46 0
1906	14	33 3	43 0	41 0	46 3	51 0
1907	14	32 3	48 3	38 3	42 3	49 3
1908	17	33 3	45 0	40 0	45 3	48 0
1909	15	32 2	47 2	42 2	47 3	52 0
1910	15	34 2	45 1	42 1	47 1	50 1
1911	11	35 0	48 0	44 0	45 0	50 2
1912	23	42 1	57 3	51 1	56 0	62 0
1913	26	40 0	57 0	50 2	55 2	61 3
Average yield, —		*33 0	46 2	40 2	46 2	51 2
Value of Crop ; Hay at 2s. per cwt., —		£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Average Cost of Manures, —		—	2 0 0	11 4	17 10	1 3 2
Value of Crop less cost of manures,		3 6 0	2 13 0	3 9 8	3 15 2	3 19 10

* Average of 250 Centres.

A satisfactory feature of the experiments is that the results have been very uniform throughout. As may be seen from the foregoing Table, the relative positions of the different plots in respect of yield have been almost identical each season.

The points that have been brought out most clearly may be stated briefly as follows:—

(I.) That a dressing of 10 tons of farmyard manure per acre, as applied to Plot 2, usually gives a substantial increase in the crop. In many instances the heaviest yield was obtained from this plot. The average figures for the whole period show, however, that if the hay crop is charged with the whole cost of the manure (4s. per ton) a loss of 13s. per acre is incurred; but, on the other hand, if only half the cost is charged, as is reasonable, a profit of 7s. per acre is obtained.

In this connection it should be remembered that the actual increase in the weight of hay does not fully represent the beneficial effects of an application of dung. Farmyard manure has a lasting

influence, and subsequent crops derive considerable benefit from a previous dressing.

(II.) Although the application of nitrate of soda alone—see Plot 3—gave a profitable return on the average, it is not recommended that this manure be used alone for meadow hay, unless under exceptional circumstances. Such a practice is calculated, in a comparatively short time, to cause deterioration in the quality of the produce by encouraging the growth of the coarser grasses to the exclusion of the finer plants.

(III.) The application of nitrate of soda and superphosphate on Plot 4 gave varying results—the average figures show a considerable profit, but at many centres a loss resulted. This manurial dressing cannot, therefore, be regarded as so generally satisfactory as a complete mixture of artificials.

(IV.) The most satisfactory results and the highest average profit were obtained from the complete dressing of artificials applied to Plot 5.

Conclusions:—These results fully justify the advice given in previous reports, viz., that where farmyard manure cannot be spared for application to meadow land, satisfactory results may confidently be expected under ordinary conditions from a complete mixture of artificial manures consisting of:—

1 cwt. Nitrate of Soda,	} per Statute Acre.
2 cwt. Superphosphate,	
2 cwt. Kainit.	

Furthermore, experience has shown that the full return from these manures is not obtained in the hay crop, for the most marked improvement is noticeable both in the quantity and quality of the aftergrass wherever they have been used. This mixture, therefore, is generally recommended for meadow land in Ireland.

The superphosphate and kainit should be applied before the end of February. These two manures may be mixed together, but the mixture should then be sown without delay. The nitrate of soda should be applied separately, at the end of March or early in April.

B.—SUPPLEMENTARY TESTS.

The following supplementary tests were carried out in conjunction with the Old Series of experiments already reviewed:—

(I.) Tests devised to ascertain the effect of applying kainit in autumn to meadow land.

In each of the four seasons 1907 to 1910, an extra plot was included in the series. The complete mixture of artificials used on Plot 5 (see Table on page 257) was applied also to this extra plot, but in the latter case the kainit was put on before November 30th, instead of in February.

After four years' trial this plot was omitted as it was found that, although kainit sometimes gave slightly better results when applied in autumn, the increase was seldom likely to repay the extra cost of sowing the manure separately.

(II.) Tests intended to demonstrate the value of basic slag as a manure for meadow hay.

In 1912 and 1913, two plots were manured with superphosphate and basic slag (high grade), respectively, in addition to kainit and nitrate of soda. All the manures were applied in spring in each case.

The average results of these tests were as follows :—

Manures Applied.	Average Yield of Hay per Statute Acre.					
	1913. (26 Centres.)			1912. (23 Centres.)		
	T.	C.	Q.	T.	C.	Q.
1 cwt. Nitrate of Soda, 2 cwt. Superphosphate , 2 cwt. Kainit, }	3	1	3	3	2	0
1 cwt. Nitrate of Soda, 2 cwt. Basic Slag (high grade), 2 cwt. Kainit, }	2	19	3	3	1	3

The average results of these tests as reproduced in the above table represent very fairly also the returns from individual centres.

In 1912 the higher yield was obtained from superphosphate at nine centres and from basic slag at thirteen centres, (in one case the yields were equal). In 1913 superphosphate gave slightly better results than basic slag at seventeen out of the twenty-six centres.

Neither manure was uniformly superior on any particular kind of soil; thus, even on heavy clay soils basic slag did not give uniformly better results than superphosphate, nor were markedly higher yields produced by the latter manure on light or medium soils.

Whilst it is most desirable that further trials should be carried out before a definite pronouncement be made as to the relative merits of these two phosphatic manures when applied to meadow hay, the experimental results obtained up to the present tend to show that superphosphate and basic slag are practically of equal value when used in conjunction with nitrate of soda and kainit.

It is worthy of note that basic slag gave slightly better results in the wet season of 1912 than in the dry summer of 1913, which may be an indication that the immediate effects of a spring application of this manure to meadow hay are realised to the greatest extent in a wet season.

C.—NEW SERIES—LIQUID MANURE EXPERIMENTS.

This series of experiments, commenced in 1911, to show the effects of the application of liquid manure to the hay crop, was repeated on the same lines in 1913. This season experiments were carried out by Agricultural Instructors at seven centres in four counties, and by Agricultural Overseers at sixty-nine centres in Congested Districts.

Detailed results of these experiments are given in the table on page 261, but for easier reference a summary of the results obtained in 1913 and the two previous years is shown in the following Table :—

Plot.	Manures applied per Statute Acre.	1913. (76 Centres.)			1911-12. (92 Centres.)				
		Average yield of Hay per Statute Acre.	Increase due to Manures.			Average yield of Hay per Statute Acre.	Increase due to Manures.		
1	No Manure,	T. C. Q. 2 4 1	T. C. Q. —			T. C. Q. 2 1 2	T. C. Q. —		
2	16 tons Farmyard Manure,	3 0 2	0 16 1			2 16 2	0 15 0		
3	16 tons Liquid Manure, .	3 2 0	0 17 3			2 18 1	0 16 3		
4	1 cwt. Nitrate of Soda, 2 cwt. Superphosphate, 2 cwt. Kainit, }	3 1 0	0 16 3			2 17 0	0 15 2		

It will be seen from the foregoing results that whilst there is very little difference in the average yield from any of the three manured plots, the slight superiority of the liquid manure plot observed in the two previous years has been maintained during the past season. The returns from individual centres show that rotation hay composed largely of Italian rye-grass responds particularly well to applications of liquid manure.

The results of these experiments up to the present show the interesting fact that equally good returns were obtained from applications of liquid manure to meadow hay in both wet and dry seasons.

Whilst the tests require to be repeated before definite conclusions are drawn, the results under review afford ample evidence as to the value of liquid manure as a dressing for hay, whether first crop, second crop, or permanent meadow, and should induce farmers to try an experiment on their own land.

The value of farmyard manure is everywhere realised, and the results of the Old Series of experiments, given in this article,

have proved that the complete mixture of artificial manures applied to Plot 5 may generally be relied upon to give profitable returns; it only remains, therefore, to state that the value of liquid manure is not yet fully appreciated by farmers in this country.

At present the liquid manure on many holdings is entirely lost, whereas it could be collected at small cost and applied to grass land during winter when farm work is slack, with benefits out of all proportion to the expense incurred.

Liquid Manure Test.—Table showing the Returns per Statute Acre from each Centre.

Name and Address of Farmer.	Crop.	Character of Soil.	Plot 1. No Manure.	Plot 2. 16 tons Farmyard Manure (applied before 15th February).	Plot 3. 16 tons Liquid Manure (applied one-half in February, and one-half in April).	Plot 4. 1 cwt. Nitrate of Soda (applied in last half March); 2 cwt. Superphosphate, 2 cwt. Kainit (applied before 15th February.)
J. H. Gray, Glonaune, Armagh.	Old Meadow	Loam, .	T. C. Q. 1 18 0	T. C. Q. 2 8 0	T. C. Q. 2 13 0	T. C. Q. 2 5 0
F. Robertson, Sprucefield, Lisburn, Down, .	1st Crop	Sandy Loam, .	2 14 0	3 10 2	4 8 2	3 16 1
J. Agnew, Tullyhenan, Banbridge, Down, .	1st Crop	Italian Clay Loam, .	2 10 0	2 14 1	4 2 1	3 1 1
S. Martin, Ashside, Cabra, Hillsborough, Down, .	2nd Crop	Loam, .	2 3 0	2 7 1	3 0 1	2 12 1
Royal Ulster Agricultural Society's Grounds, Balmoral, Down, .	Old Meadow	Cold Heavy Clay, .	3 10 0	3 15 0	4 10 0	3 5 0
Mrs. Murray, Belan, Noone, Kildare, .	1st Crop	Gravelly, .	2 11 0	3 0 1	2 9 0	3 10 2
Asylum Farm, Mullingar, Westmeath, .	1st Crop	Loam, .	1 2 0	2 6 0	1 18 0	1 14 0
Average yield per statute acre, Increase due to Manures, . . .	- - -	- - -	2 6 3	2 17 1 0 10 2	3 6 0 0 19 1	2 17 3 0 11 0
Congested Districts (average of 69 experiments) Increase due to Manures, . . .	- - -	- - -	2 4 0	3 0 3 0 16 3	3 1 2 0 17 2	3 1 1 0 17 1
Average results of both County and Congested District experiments . . .	- - -	- - -	4 1	3 0 2 0 16 1	3 2 0 0 17 3	3 1 0 0 16 3

D.—PRELIMINARY EXPERIMENTS ON PEATY SOILS.

The results of previous experiments have made it possible to recommend with confidence a standard mixture of artificial manures for the meadow hay crop on average soils. The manurial requirements of peaty, moory or boggy soils, however, require special consideration. Accordingly, in order to obtain reliable information on the subject, the Department decided to carry out some experiments in connection with the manuring of meadow hay on typical peaty soils.

Before formulating a definite scheme, however, it was deemed advisable to conduct a number of preliminary tests, the results of which would probably indicate suitable lines for carrying out more systematic investigations.

During the seasons 1912 and 1913, ten experiments were conducted in six counties by Agricultural Instructors.

The following Table shows the nature and results of the tests:—

Name and Address of Farmer.	Percentage of Organic Matter and Combined Water (Department's Analysis).	Plot 1. No Manure.	Plot 2. 1 cwt. Nitrate of Soda, 2 cwt. Superphosphate, 2 cwt. Kainit.	Plot 3. 1 cwt. Nitrate of Soda, 2 cwt. Basic Slag (high grade) 2 cwt. Kainit.	Plot 4. 1 cwt. Nitrate of Soda, 4 cwt. Basic Slag (high grade) 2 cwt. Kainit.
1912		T. C. Q.	T. C. Q.	T. C. Q.	T. C. Q.
M. Cahill, Killygorman, Killeshandra, Co. Cavan.	22.3	2 3 1	3 3 0	2 18 1	3 4 3
J. Kane, Mylerstown, Robertstown, Co. Kildare.	25.4	1 0 0	1 18 0	1 18 2	1 14 2
J. Murtagh, Rathmore, Athboy, Co. Meath.	18.5	2 3 0	3 14 2	3 12 0	3 14 1
1913.					
J. Farrell, Robertstown, Co. Kildare.	25.5	3 5 2	3 14 1	3 16 3	4 0 0
J. Byrne, Cowpark, Philipstown, King's Co.	31.3	2 1 0	2 18 2	2 17 1	3 1 1
Mrs. Ryan, Clonavo, Clonbulloge, King's Co.	22.0	1 12 0	3 0 0	2 11 2	2 12 1
J. Dempsey, Derreens, Attymachugh, Co. Mayo.	17.5	2 14 0	3 15 2	3 10 3	4 10 0
J. Murtagh, Rathmore, Athboy, Co. Meath.	32.9	1 15 0	2 15 0	3 0 0	2 16 0
W. Cralhan, Wilkinstown, Navan, Co. Meath.	20.7	2 0 0	3 5 0	3 10 0	3 4 0
A. Oates, Cootehall, Boyle, Co. Roscommon.	22.8	1 17 0	3 8 2	3 14 0	4 2 2
Average yield per statute acre.	-	2 1 0	3 3 1	3 3 0	3 6 0
Increase due to Manures.	-	—	1 2 1	1 2 0	1 5 0
Cost of Manures.	-	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Value of Crop, less Cost of Manures, Hay at 2s. per cwt.	-	4 2 0	5 1 6	5 1 0	5 6 0

In the above estimates the different manures were valued per ton as follows:—Nitrate of soda, £12; superphosphate, £3 10s.; basic slag, £3 10s.; kainit, £3.

Since the term “peaty” soil is often used in a rather indefinite sense, it was decided to determine the amount of organic matter in a representative sample of soil from the land under each experiment in order that the effects of the various manures might be considered in conjunction with the amount of vegetable matter in the soil.

That there is a considerable variation in the amounts of organic matter in so called “peaty” soils is evident from the above analytical results: for instance the highest figure recorded, 82.9 per cent. is almost double that of the lowest, 17.5 per cent. These

figures are interesting, and whilst they do not admit at present of definite interpretation it is possible that such data collected systematically may serve a useful purpose.

The average results of these preliminary experiments show that each of the manurial dressings produced practically the same increase in yield at almost the same cost. Any advantage there may be appears to lie with the light nitrogenous and liberal phosphatic dressing used on Plot 4.

It is hoped to continue the tests on a modified and more comprehensive scale.

THE MANURING OF PASTURE LAND.

The results of the experiments described in this report show that judicious manuring of meadow hay is distinctly profitable, and whilst the effects of manures on pastures cannot be estimated so readily, there is no doubt that on a considerable area of grazing land in this country a moderate outlay on manures from time to time would be amply repaid.

Although the manurial requirements of the hay crop and of pasture are similar in many respects, it should be remembered that it is not often necessary to apply expensive nitrogenous manures to pasture.

On light and medium soils, a spring application of from 2 to 3 cwts. of superphosphate and 2 cwts. of kainit, or of from 4 to 5 cwts. of potassic superphosphate, per statute acre, is recommended. On heavy, wet land and on peaty soils, a dressing of from 6 to 8 cwts. of basic slag and from 2 to 3 cwts. of kainit per statute acre applied in November, would probably give better and certainly more lasting results.

Liquid manure applied to pasture land in March or April has an excellent effect.

III.—POTATOES.

A.—MANURIAL TEST (OLD SERIES).

This series of experiments, commenced in 1901 with the object of ascertaining what use can be made of artificial manures by way of supplementing applications of farmyard manure to the potato crop, was brought to a close in 1911, after the tests had been repeated during eleven consecutive seasons.

The most notable feature of these experiments, probably unique in several respects in work of this nature, are :—

- (I.) The duration of the trials—eleven years—during which period seasons differing widely in character were experienced.
- (II.) The scope of the experiments—the tests were carried out in every county in Ireland, on most kinds of soil on which potatoes are habitually grown, and with practically all the better-known maincrop varieties.
- (III.) The uniformity of the results throughout the entire period.

The conclusive results of this series of experiments have made it possible to recommend with the utmost confidence, a system of manuring proved to be admirably suited to most of the conditions under which potatoes are grown in this country. Furthermore, the information derived from these tests has been of the greatest assistance in designing the New Series of experiments, and also those recently commenced in sea-board localities and on peaty soils.

Detailed returns from individual experimental centres were published annually in the Department's JOURNAL for each of the years 1901 to 1908 ; subsequently, however, the number of experiments carried out each season became so large that it was found impossible to adhere to this system, and accordingly, general summaries only were published. It may be stated, however, that each County Agricultural Committee has published from year to year, detailed results of tests made by their Agricultural Instructor. Thus potato growers have been enabled to consult the general results for the whole country as set forth in the Department's reports, and also the local returns as published by their County Agricultural Committee.

A general summary of the complete results of the experiments for the entire period 1901 to 1911, is reproduced in the following Table :—

MANURIAL EXPERIMENTS (OLD SERIES).

TABLE I.—Showing a General Summary of the Complete Series, including the Returns from 353 Centres during the eleven years, 1901 to 1911 inclusive.

Year.	No. of Experiments.	Plot 1. No Manure.	Plot 2. 15 Tons Farmyard Manure.	Plot 3. 20 Tons Farmyard Manure.	Plot 4. 15 Tons Farmyard Manure, 1 cwt. Sulphate of Ammonia.	Plot 5. 15 Tons Farmyard Manure, 1 cwt. Sulphate of Ammonia, 4 cwt. Superphosphate.	Plot 6. 15 tons Farmyard Manure, 1 cwt. Sulphate of Ammonia, 4 cwt. Superphosphate, 1 cwt. Muriate of Potash.	Plot 7. 15 Tons Farmyard Manure, 1 cwt. Sulphate of Ammonia, 4 cwt. Superphosphate, 1 cwt. Sulphate of Potash.
1901	17	T. C. 4 4	T. C. 9 15	T. C. 10 13	T. C. 10 16	T. C. 11 12	T. C. 12 1	T. C. —
1902	23	4 7	7 19	8 18	8 19	9 16	10 11	—
1903	20	3 1	7 9	8 2	8 6	9 10	10 5	—
1904	32	3 12	7 16	8 14	8 10	9 9	10 9	—
1905	33	4 13	9 1	10 3	9 16	10 5	11 5	—
1906	37	3 12	7 6	7 19	7 17	8 16	9 18	9 13
1907	59	3 12	7 13	8 11	8 14	9 9	10 5	10 3
1908	49	4 9	9 0	9 13	9 19	10 14	11 14	11 9
1909	32	4 4	8 9	9 7	9 10	10 2	10 19	10 18
1910	32	4 7	8 12	9 15	9 12	10 14	11 10	11 5
1911	19	4 3	8 9	9 6	9 7	10 3	10 18	10 15
Average Total Yield.		4 0	8 4	9 2	9 3	9 19	10 17	*10 12
Average Yield of Small Potatoes.		1 3	1 8	1 11	1 11	1 13	1 12	1 17
		£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Value of Crop, Saleable at 2s. per cwt. Small, at 1s. per cwt.,		6 17 0	15 0 0	16 13 0	16 14 0	18 5 0	20 2 0	19 7 0
Cost of Manures.		—	3 0 0	4 0 0	3 13 8	4 6 0	4 16 5	4 17 1
Value of Crop, after deducting Cost of Manures.		6 17 0	12 0 0	12 13 0	13 0 4	13 19 0	15 5 7	14 9 11

* Average of 228 centres only.

The above figures represent the returns per statute acre.

The principal showings of the above returns may be briefly epitomised as follows:—

(I.) Comparing Plots 2 and 3, manured with 15 and 20 tons of farmyard manure respectively, it is seen that, if no account be taken of the slightly greater cost of applying the heavier dressing of dung there is a balance of 13s. per acre in favour of the more liberal manuring. It must be borne in mind, however, that these figures do not fully represent the value of dung, which possesses a considerable “residual” value.

(II.) The addition of 1 cwt. sulphate of ammonia to a dressing of 15 tons of farmyard manure, on Plot 4, gave a profitable return each year.

(III.) On Plot 5, the addition of 4 cwt. superphosphate to a dressing of 1 cwt. sulphate of ammonia and 15 tons of dung resulted in a profit in nine years out of eleven; the general average figures show a return of 18s. 8d. over plot 4.

(IV.) The largest average yield and the highest average profit have been obtained each year from the plot manured with a complete mixture of artificials and a moderate dressing of farmyard manure.

(V.) Comparing Plots 6 and 7, manured with muriate of potash and sulphate of potash respectively, in addition to sulphate of ammonia, superphosphate and dung, it is seen that in each year a slightly higher yield was obtained from the muriate of potash plot.

Conclusions :—The results of this Old Series of experiments, and also those of the New Series, particulars of which are given below, fully justify the advice given in previous reports, viz., that, as a rule, and especially where the supply is limited, as is usually the case, farmers should apply dung in moderate quantities and supplement it with suitable artificial manures. The experiments show in a most convincing manner that, on most soils, satisfactory results may confidently be expected from the application of—

1 cwt. Sulphate of Ammonia,	} per Statute Acre,
4 cwt. Superphosphate,	
1 cwt. Muriate of Potash,	

in addition to a moderate dressing of farmyard manure.

The artificial manures should be applied in the drills over the farmyard manure.

B.—MANURIAL TEST (NEW SERIES).

One of the first showings of the Old Series of experiments was, that the most generally satisfactory manurial dressing for the potato crop consists of a moderate quantity of farmyard manure in conjunction with a complete mixture of artificials. Whilst the mixture already quoted had proved eminently satisfactory, it was thought desirable to prove to what extent, if any, the quantity of any manurial ingredient might be modified. Accordingly, in 1908 a new series of experiments was devised with the object of ascertaining what quantity of each of the three ingredients, nitrogen, phosphate and potash, such a complete mixture should contain.

In these tests the same three manures, sulphate of ammonia, superphosphate and muriate of potash, were applied to each plot in addition to a moderate dressing of farmyard manure, but the quantity of each artificial manure was varied.

In 1913 these tests were carried out at 44 centres in 29 counties.

or convenient reference and comparison, the average results for 1913, and also for the previous five years, are summarised briefly in the following Tables.

In each Table, Plot No. 3, manured with the Standard mixture of artificials viz., 1 cwt. sulphate of ammonia, 4 cwts. superphosphate, 1 cwt. muriate of potash, forms the basis of comparison for the remainder of the plots.

(a) Varying quantities of Superphosphate.

Plot.	Manures applied per Statute Acre.	1913. (44 Centres.)		Average of five years 1908-12. (225 Centres.)	
		Total yield per Statute Acre.	Value of Crop after deducting cost of Manures.	Total yield per Statute Acre.	Value of Crop after deducting cost of Manures.
		T. C.	£ s. d.	T. C.	£ s. d.
2	3 cwt. Superphosphate with Dung, Sulphate of Ammonia and Muriate of Potash, .	10 11	14 17 0	10 16	14 18 3
3	4 cwt. Superphosphate, do., .	10 17	15 6 6	11 2	15 8 4
4	5 cwt. Superphosphate, do., .	11 0	15 7 0	11 3	15 6 10

(b) Varying quantities of Sulphate of Ammonia.

Plot	Manures applied per Statute Acre.	1913. (44 Centres.)		1908-12. (225 Centres.)	
		Total yield per Statute Acre.	Value of Crop after deducting cost of Manures.	Total yield per Statute Acre.	Value of Crop after deducting cost of Manures.
		T. C.	£ s. d.	T. C.	£ s. d.
3	1 cwt. Sulphate of Ammonia, with Dung, Superphosphate and Muriate of Potash, .	10 17	15 6 6	11 2	15 8 4
5	1½ cwt. Sulphate of Ammonia, do., .	11 8	15 18 9	11 6	15 8 10
6	2 cwt. Sulphate of Ammonia, do., .	11 13	16 5 0	11 11	15 8 9

(c) Varying quantities of Muriate of Potash.

Plot.	Manures applied per Statute Acre.	1913. (44 Centres.)		1908-12. (22½ Centres.)	
		Total yield per Statute Acre.	Value of Crop after deducting cost of Manures.	Total yield per Statute Acre.	Value of Crop after deducting cost of Manures.
		T. O.	£ s. d.	T. O.	£ s. d.
3	1 cwt. Muriate of Potash, with Dung, Superphosphate and Sulphate of Ammonia.,	10 17	15 6 6	11 2	15 8 4
7	1½ cwt. Muriate of Potash, do.,	11 4	15 13 0	11 14	15 12 0
8	2 cwt. Muriate of Potash, do.,	11 6	15 11 6	11 10	15 11 9

In 1912 an extra plot, No. 9, was included in the experiments with the object of showing the effects of the application of three-quarters of the amount of the standard dressing of artificials applied on Plot 3.

The following Table shows the returns obtained from dung alone, dung and three-quarters of the standard dressing of artificials, and dung with the full quantity of artificials, respectively :—

(d) Varying quantities of the Standard Mixture.

Plot.	Manures applied per Statute Acre.	1913 (44 Centres.)		1912 (49 Centres.)	
		Total yield per Statute Acre.	Value of Crop after deducting cost of Manures	Total yield per Statute Acre.	Value of Crop after deducting cost of Manures.
		T. O.	£ s. d.	T. O.	£ s. d.
1	15 tons Farmyard Manure,	8 5	12 4 0	7 17	11 0 0
9	15 tons Farmyard Manure, 4½ cwt. Standard Mixture of Artificials (¾ dressing),	10 2	14 7 8	10 0	13 13 8
3	15 tons Farmyard Manure, 6 cwt. Standard Mixture of Artificials (Full dressing),	10 17	15 6 6	10 10	14 1 6

The prices per ton put upon the artificial manures in 1913 were as follows :—superphosphate, £3 10s.; sulphate of ammonia, £15 10s.; muriate of potash, £11.

From the commencement, the results of this New Series of experiments have been very uniform. They show clearly that it is not

advisable, as a rule, to apply any one of the three manures, superphosphate, sulphate of ammonia and muriate of potash, in greater quantities than those recommended in the standard mixture. Although the additional quantities used in these experiments produced, on the average, a sufficient increase in yield to repay the extra expenditure, nevertheless, in many cases the application of heavy dressings was not satisfactory.

On the other hand, of all the plots manured with artificials, the lowest yields and smallest profits were obtained from the two plots (No. 2, Table (a) and No. 9, Table (d)), which received smaller quantities than those specified in the standard mixture.

These results do not warrant any change in the standard mixture which has proved so eminently satisfactory throughout both Series of experiments.

C.—PRELIMINARY MANURIAL TESTS ON PEATY SOILS.

In view of the fact that very few of the Old or New Series of manurial experiments were carried out on pronounced peaty soils, the Department decided to investigate more thoroughly the manurial requirements of the potato crop on this class of land. Accordingly, during the last two seasons a number of preliminary tests have been carried out in order to ascertain the best lines on which to attack the problem systematically.

Experiments were conducted at twelve centres in eight counties in 1912, and at sixteen centres in thirteen counties in 1913.

The general plan of the experiments, together with individual and average results, are given in Table II. on page 272.

It will be seen from this Table that, so far, the various manurial dressings have given variable results. It is possible that this lack of uniformity is due, to some extent at least, to the great contrast between the summers of 1912 and 1913. The investigations, however, have not yet reached a stage at which conclusions can be formed with any degree of certainty.

D.—MANURIAL TESTS WITH SEAWEED.

In many districts near the coast, seaweed is used to a considerable extent instead of farmyard manure for potatoes. Farmers frequently cart the weed long distances, so convinced are they of its fertilising value. Analyses show that seaweed and farmyard manure are very similar in composition except that, as a rule, the former contains rather more potash but less phosphate than the latter.

Since seaweed undoubtedly possesses a distinct manurial value, the Department considered that a useful purpose would be served by carrying out experiments to provide reliable information as to the best methods of utilising it. Accordingly in 1912, a

series of tests was commenced with potatoes in seaboard localities in order to determine :—

- (I.) The relative values of seaweed and farmyard manure.
- (II.) The most suitable artificial manures to use in conjunction with seaweed.

The tests were repeated on the same lines in 1918.

Particulars of the manurial dressings employed and detailed results of each experiment are given in the Table III. on page 274.

In estimating the returns from the different plots, seaweed has been valued at 3s. per ton.

It will be seen from the Table that the average results of the two seasons' tests are remarkably uniform; indeed, the order of the plots in respect of yield is almost identical each year. Whilst definite conclusions cannot be drawn from the experiments at present, the returns under review seem to indicate that :—

- (I.) Weight for weight, seaweed seldom produces as heavy a crop of potatoes as does farmyard manure.
- (II.) Muriate of potash generally has less effect when used with seaweed than when applied with dung.
- (III.) Seaweed gives the best results on light soils and, possibly, in a dry season.

E.—VARIETY TEST.

This experiment, designed to test the relative cropping capabilities of different varieties of potatoes, was conducted at fifty-one centres in twenty-two counties, by Agricultural Instructors, and by Agricultural Overseers at forty-two centres in Congested Districts.

The average results of these tests in 1918 are summarised in the following Tables :—

(a)—County Experiments.

Variety of Potato.	Saleable.		Small and Diseased.		Total.	
	T.	C.	T.	C.	T.	C.
MAINCROP VARIETIES—						
Summit,	11	10	1	11	13	1
Up-to-Date,	10	19	1	11	12	10
Duchess of Cornwall,	10	12	1	12	12	4
Old Champion,	8	19	2	0	10	19
Irish Queen,	9	13	1	2	10	15
Shamrock,	9	10	1	5	10	15
MID-SEASON VARIETIES—						
Abundance,	8	16	1	10	10	6
British Queen,	8	2	1	14	9	16

(b)—Congested District Experiments.

Variety of Potato.	Saleable.		Small.		Diseased.		Total.	
	T.	C.	T.	C.	T.	C.	T.	C.
MAIN-CROP VARIETIES—								
Summit,	10	9	1	10	0	2	12	1
Erin's Best,	8	17	2	5	0	4	11	6
Bobbie Burns,	8	18	2	2	0	5	11	5
Up-to-Date,	8	17	1	13	0	9	10	19
Champion,	8	3	1	16	0	9	10	8
Invincible,	8	16	1	5	0	5	10	6
Irish Queen,	8	16	1	0	0	7	10	3
Shamrock,	8	2	1	4	0	3	9	9

Remarks.

The variety Summit has given the heaviest yield in both series of experiments; it is a white round potato, excellent in every respect, except as regards cooking quality, concerning which somewhat variable reports have been received.

For the second time, during the last eleven years, the yield from the varieties of the Up-to-Date type has been exceeded.

Duchess of Cornwall so closely resembles Up-to-Date that it may be regarded as identical with that variety. Varieties of this type are cultivated most extensively in districts from which potatoes are exported; they may safely be relied upon to produce heavy yields.

As in past years, the yield of saleable potatoes from Irish Queen is greater than from Champion.

British Queen can still be regarded as a satisfactory variety for mid-season use.

RECOMMENDATIONS.

More than half the total area under potatoes in Ireland is planted with the Champion. Having regard to these experiments and to reports received from many other sources, the Department strongly urge farmers who continue to grow Champion to test the variety Irish Queen. This potato can be recommended with confidence as likely to meet all the requirements of the Champion and to produce a heavier crop of marketable tubers. Irish Queen should be planted close and should not be manured too liberally, otherwise the tubers will be too large.

It is suggested that for summer use British Queen should be grown.

If more attention were given to the selection of varieties, the yield of potatoes in this country would be appreciably increased.

MANURIAL TEST

TABLE II.—Showing the Returns per

Centre.	Percentage of Organic Matter and combined Water in Soil; Department's Analysis.	PLOT 1.			PLOT 2.		
		15 tons Farm-yard Manure.			15 tons Farm-yard Manure, 1 cwt. Sulphate of Ammonia, 4 cwt. Super-phosphate, 1 cwt. Muriate of Potash.		
		Sale-able.	Small	Total	Sale-able.	Small	Total
		T. C.	C.	T. C.	T. C.	C.	T. C.
1912							
Dervock, Co. Antrim,	38.3	5 16	25	7 1	5 16	35	7 11
Ballymoney, Co. Antrim,	32.5	6 10	16	7 6	7 1	22	8 3
Birches, Co. Armagh,	23.4	0 18	8	1 6	2 8	21	3 9
Bawn, Killeshandra, Co. Cavan,	21.0	3 2	66	6 8	3 11	75	7 6
Macken, Killeshandra, Co. Cavan,	22.3	7 6	44	9 10	7 17	95	12 12
Darragh, Co. Clare	28.4	6 5	25	7 10	8 15	32	10 7
Ramelton, Co. Donegal,	30.0	10 16	26	12 2	16 16	25	18 1
Lettermacaward, Co. Donegal,	13.3	7 4	44	9 8	14 0	30	15 10
Listowel, Co. Kerry,	25.9	10 9	33	12 2	8 10	43	10 13
Tullamore, King's County,	31.9	5 13	23	6 16	8 15	53	11 8
Fortel, Birr, King's County,	32.5	1 8	7	1 15	3 10	14	4 4
Dungarvan, Co. Waterford,	11.8	6 7	34	8 1	8 1	60	11 1
1913							
Stranraer, Co. Antrim,	38.6	4 1	20	5 1	5 16	63	8 19
Birches, Co. Armagh,	23.6	7 18	27	9 5	14 16	16	15 12
Mullagh, Co. Clare,	32.4	6 3	20	7 3	7 10	25	8 15
Quirrin, Co. Clare,	27.5	6 18	35	8 13	6 16	38	8 14
Gleneely, Co. Donegal,	25.8	5 2	16	5 18	9 0	18	9 18
Carndonagh, Co. Donegal,	26.6	8 10	20	9 10	12 10	20	13 10
Bryansford, Co. Down,	24.5	12 16	13	13 9	17 10	11	18 1
Brookeboro', Co. Fermanagh,	30.3	4 1	31	5 12	6 9	42	8 11
Tuam, Co. Galway,	22.5	6 18	57	9 15	9 15	45	12 4
Ballylongford, Co. Kerry,	27.6	7 18	17	8 15	11 3	23	12 6
Rathmore, Co. Kerry,	15.0	8 18	14	9 12	10 14	22	11 16
Robertstown, Co. Kildare,	23.8	6 4	37	8 1	6 15	31	8 0
Philipstown, King's County,	37.0	9 13	15	10 8	12 10	16	13 0
Bonniconlon, Co. Mayo,	24.8	5 19	28	7 7	7 14	34	9 8
Coat'sland, Co. Tyrone,	28.6	6 12	40	8 12	11 19	64	14 13
Castlepollard, Co. Westmeath,	24.6	6 6	13	6 19	9 4	11	0 16
Average Yield per Statute Acre,		6 0	29	7 9	7 18	42	10 0
Increase due to Artificial Manures,		£ s. d.	—	—	1 18	13	2 11
Cost of Manures,		3 0	0	—	£ s. d.	5 0	6
Value of Crop less cost of Manures; Saleable Potatoes, 2s. per cwt.; Small, 1s. per cwt.		10 9	0	—	12 17	6	—
1913							
Average Yield per Statute Acre,		T. C.	C.	T. C.	T. C.	C.	T. C.
Increase due to Artificial Manures,		7 2	25	8 7	10 0	29	11 9
Cost of Manures,		£ s. d.	—	—	2 18	5	8 3
Value of Crop less cost of Manures; Saleable Potatoes, 2s. per cwt.; Small, 1s. per cwt.		3 0	0	—	£ s. d.	5 0	6
		12 9	0	—	16 8	6	—

ON PEATY SOILS.

Statute Acre from each Centre.

PLOT 3.			PLOT 4.			PLOT 5.			PLOT 6.			PLOT 7.			PLOT 8.		
15 tons Farm-yard Manure, 1 cwt. Sulphate of Ammonia, 4 cwt. Super-phosphate, 1 cwt. Muriate of Potash.			15 tons Farm-yard Manure, 4 cwt. Super-phosphate, 1 cwt. Muriate of Potash.			15 tons Farm-yard Manure, 1 cwt. Sulphate of Ammonia, 4 cwt. Super-phosphate, 1 cwt. Muriate of Potash.			15 tons Farm-yard Manure, 1 cwt. Sulphate of Ammonia, 4 cwt. Super-phosphate, 2 cwt. Muriate of Potash.			15 tons Farm-yard Manure, 1 cwt. Sulphate of Ammonia, 4 cwt. Basic Slag (high grade), 1 cwt. Muriate of Potash.			1½ cwt. Sulphate of Ammonia, 6 cwt. Super-phosphate, 1½ cwt. Muriate of Potash.		
Sale-able.	Small.	Total.	Sale-able.	Small.	Total.	Sale-able.	Small.	Total.	Sale-able.	Small.	Total.	Sale-able.	Small.	Total.	Sale-able.	Small.	Total.
T. C.	O.	T. C.	T. C.	O.	T. C.	T. C.	O.	T. C.	T. C.	O.	T. C.	T. C.	O.	T. C.	T. C.	O.	T. C.
4 1	20 5	1 6	11 20	7 11	5 18	25 7	3 6	1 25	7 6	6 11	30 8	1 5	11 5	8 6	1 9	15 13	1 9
1 27	8 8	7 7	16 8	3 8	14 27	10 1	7 18	24 9	2 7	1 32	8 3	8 19	1 9	15 13	1 9	15 13	1 9
8 1	50 10	11 12	7 65	15 12	6 13	12 6	68 15	14 10	7 74	14 11	30 7	7 14	0 9	1 13	1 13	1 13	1 13
4 4	89 8	13 4	9 44	6 13	5 6	71 8	17 7	15 66	11 1	6 17	58 9	15 6	0 6	9 6	9 6	9 6	9 6
9 3	62 12	5 9	10 80	13 10	8 88	12 16	10 8	66 13	14 7	10 80	11 10	6 0	74 9	14 9	14 9	14 9	14 9
8 3	38 10	1 8	10 30	10 0	8 12	28 10	0 8	6 36	10 2	7 2	43 9	5 8	12 32	10 4	10 4	10 4	10 4
14 16	26 16	2 14	15 27	16 2	15 12	23 16	15 17	0 27	18 7	14 18	33 16	11 11	3 36	12 19	12 19	12 19	12 19
16 12	48 19	0 15	13 33	17 6	18 3	40 20	3 21	14 34	23 8	15 7	37 17	4 13	18 30	15 8	15 8	15 8	15 8
10 10	41 12	11 10	13 37	12 10	9 11	50 12	1 8	5 55	11 0	8 19	52 11	11 9	1 61	12 2	12 2	12 2	12 2
8 4	45 10	9 8	2 61	11 3	8 18	64 12	2 7	14 54	10 8	9 4	66 12	10 6	9 48	8 17	8 17	8 17	8 17
3 12	9 4	1 3	9 9	3 18	4 1	13 4	14 4	7 12	4 19	2 12	10 3	2 5	12 20	6 12	6 12	6 12	6 12
8 5	50 10	15 8	10 48	10 18	8 5	53 10	18 8	17 47	11 4	10 7	60 13	7 9	6 58	12 4	12 4	12 4	12 4
6 4	38 8	2 5	3 27	6 10	7 4	106 12	10 7	2 91	11 13	8 14	48 11	2 7	2 55	9 17	9 17	9 17	9 17
15 7	16 10	3 14	8 22	15 10	14 9	17 15	6 13	15 26	15 12	2 28	13 10	10 16	25 12	1 1	1 1	1 1	1 1
6 19	26 8	5 6	3 22	7 5	6 0	26 7	6 6	0 22	7 2	7 13	27 9	0 6	3 23	7 6	7 6	7 6	7 6
7 3	39 9	2 7	14 40	9 14	7 15	40 9	15 6	7 26	7 13	8 3	35 9	18 7	4 43	9 7	9 7	9 7	9 7
8 2	17 8	19 9	2 20	10 2	9 0	16 9	16 9	1 15	9 16	9 5	19 10	4 8	8 19	9 7	9 7	9 7	9 7
9 4	25 10	9 9	0 24	10 4	9 10	24 10	14 10	11 23	11 14	12 1	29 13	10 11	12 23	12 15	12 15	12 15	12 15
17 7	11 17	17 15	17 11	16 8	18 0	14 18	14 17	13 11	18 4	14 19	11 15	10 15	1 11	15 12	15 12	15 12	15 12
5 10	39 7	9 4	5 39	6 4	6 9	41 8	10 7	17 42	9 19	7 12	40 9	12 5	1 33	6 14	6 14	6 14	6 14
8 14	51 11	5 8	12 48	11 0	10 14	41 12	15 10	8 37	12 5	9 16	24 11	0 9	13 57	12 10	12 10	12 10	12 10
10 6	26 11	12 11	0 28	12 8	9 7	26 10	13 11	2 23	12 5	9 10	20 10	10 11	13 30	13 3	13 3	13 3	13 3
10 1	42 12	3 9	7 22	10 9	10 14	21 11	15 11	8 23	12 11	11 1	24 12	5 10	0 43	12 3	12 3	12 3	12 3
6 7	39 8	6 6	2 43	8 5	6 15	42 8	17 6	0 38	7 18	4 15	31 6	6 5	12 62	8 14	8 14	8 14	8 14
10 16	10 11	6 10	3 6	10 9	13 16	11 14	7 11	13 8	12 11	10 10	12 0	13 9	9 13	18 18	18 18	18 18	18 18
7 7	32 8	19 6	7 31	7 18	6 9	30 7	19 7	14 31	9 5	6 18	26 8	4 0	0 24	7 4	7 4	7 4	7 4
10 3	37 12	0 9	19 41	12 0	11 17	39 13	16 11	1 46	13 7	9 3	43 11	6 9	5 52	11 17	11 17	11 17	11 17
8 8	10 8	18 7	16 10	8 6	9 0	20 10	6 9	17 15	10 12	10 7	16 11	3 7	6 11	7 17	7 17	7 17	7 17
8 11	42 10	13 9	3 39	11 2	9 10	46 11	16 9	18 9	18 43	12 1	8 18	47 11	5 8	6 48	10 14	10 14	10 14
2 11	13 3	4 3	3 10	3 13	3 10	17 4	7 3	18 14	4 12	2 18	18 3	16 2	6 19	3 5	3 5	3 5	3 5
£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
4 12	9 4	5 0	4 5	0 0	5 6	0 0	5 11	6 0	5 0	6 0	5 0	6 0	3 0	9 0	3 0	9 0	3 0
14 11	3 0	16 0	0 0	16 0	0 0	16 7	6 0	15 2	6 0	15 19	3 0	15 19	3 0	15 19	3 0	15 19	3 0
T. C.	C.	T. C.	T. C.	C.	T. C.	T. C.	C.	T. C.	T. C.	C.	T. C.	T. C.	C.	T. C.	T. C.	C.	T. C.
9 5	29 10	14 14	8 16	27 10	3 1	17 32	11 9	9 17	30 11	7 9	12 27	10 11	2 12	1 18	0 33	10 13	10 13
2 3	4 2	7 1	14 2	1 16	2 15	7 3	2 2	2 15	5 3	0 2	10 2	10 2	1 18	0 33	10 13	10 13	10 13
£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
4 12	9 4	5 0	4 5	0 0	5 6	0 0	5 11	6 0	5 0	6 0	5 0	6 0	3 0	9 0	3 0	9 0	3 0
15 6	3 0	14 14	0 0	16 0	0 0	15 12	6 0	15 10	6 0	16 12	3 0	16 12	3 0	16 12	3 0	16 12	3 0

MANURIAL TEST

Table III.—showing the Returns per

Centre.	Character of Soil.	Plot 1. 15 tons Farmyard Manure.		
		Sale- able.	Small	Total.
		T. O.	C.	T. C.
1912.				
Lettermacaward, Co. Donegal,	Sandy loam,	16 5	33	17 18
Greencastle, Co. Donegal,	Sandy loam,	3 0	17	3 17
Ballymartin, Co. Down,	Brashy loam,	9 17	48	12 5
Ballymartin, Co. Down,	Loam,	6 9	51	9 0
Killowen, Co. Down,	Brashy Loam	8 7	64	11 1
Rush, Co. Dublin,	Sandy,	7 7	41	9 8
Dundalk, Co. Louth,	Sandy loam,	6 16	45	9 1
Killala, Co. Mayo,	Friable clay,	10 16	80	14 16
1913.				
Carndonagh, Co. Donegal,	Peaty,	8 10	20	9 10
Strangford, Co. Down,	Sandy loam,	14 16	30	16 6
Knock, Co. Clare,	Loam,	3 12	31	5 3
Kilmurry-M'Mahon, Co. Clare,]	Peaty,	6 8	64	9 2
Jenkenstown, Co. Louth,	Sandy loam,	4 12	11	5 3
Ballycastle, Co. Mayo,	Stiff clay,	8 10	20	9 10
Rathlee, Co. Sligo,	Strong loam,	10 1	38	11 19
Dungarvan, Co. Waterford,	Loam,	12 3	15	12 18
Sarse Hill, Kilmore, Co. Wexford,	Sandy,	2 0	8	2 8
Kilmore, Co. Wexford,	Sandy,	3 16	40	5 16
Average yield per Statute Acre,		8 12	46	10 18
Cost of Manures,		£	s. d.	
		3	0 0	
Value of Crop less cost of Manures; Saleable Potatoes, 2s. per cwt.; Small, 1s. per cwt. .		16	10 0	
1912.				
Average yield per Statute Acre,		T. O.	C.	T. C.
Cost of Manures,		7 8	27	8 15
		£	s. d.	
		3	0 0	
Value of Crop less Cost of Manures; Saleable Potatoes, 2s. per cwt.; Small, 1s. per cwt. .		13	3 0	
1913.				

F.—SPROUTING SEED POTATOES.

Late Varieties.

During the past season, these experiments were carried out in thirteen counties at forty-seven centres. At each centre the tests were made under similar conditions as to soil, manuring, variety, and cultivation, the only difference being that the seed for one plot was sprouted (as explained in the Department's leaflet No. 58) and the seed for the other plot was not. The average results were as follows :—

County.	No. of Experi-ments.	Average Yield per Statute Acre.						Average gain in Yield due to Sprout-ing.
		Sprouted.			Unsprouted.			
		Saleable	Small.	Total.	Saleable	Small.	Total.	
Antrim,	2	T. C. 19 4	T. C. 1 5	T. C. 20 9	T. C. 16 10	T. C. 1 14	T. C. 18 4	T. C. 2 5
Armagh,	5	8 15	1 14	10 9	6 8	1 16	8 4	2 5
Cork,	1	12 4	1 8	13 12	10 3	1 8	11 11	2 1
Down,	3	11 3	0 17	12 0	9 8	1 3	10 11	1 9
Kilkenny,	4	6 6	2 2	8 8	4 9	2 4	6 13	1 15
King's,	6	8 16	0 19	9 15	6 8	0 17	7 5	2 10
Londonderry,	6	11 9	1 8	12 17	8 9	1 1	9 10	3 7
Mayo,	1	8 6	1 4	9 10	6 5	1 5	7 10	2 0
Roscommon,	2	12 15	1 16	14 11	10 10	1 12	12 2	2 9
Tipperary,	2	9 13	1 4	10 17	7 19	1 9	9 8	1 9
Tyrone,	9	10 16	1 9	12 5	8 19	1 14	10 13	1 12
Wexford,	5	7 13	1 9	9 2	6 3	1 13	7 16	1 6
Wicklow,	1	14 2	3 0	17 2	13 12	3 0	16 12	0 10

SUMMARY of Results of Experiments on the Sprouting of Late Potatoes for eleven years, 1903-13.

	No. of Experiments	Average Yield per Statute Acre.		Average gain in Yield due to Sprouting.
		Sprouted Seed.	Unsprouted Seed.	
		T. C.	T. C.	T. C.
1903,	12	11 1	9 8	1 13
1904,	34	11 6	8 13	2 13
1905,	91	12 17	10 16	2 1
1906,	67	11 9	9 2	2 7
1907,	67	10 6	8 6	2 0
1908,	67	13 0	10 15	2 5
1909,	50	12 19	10 4	2 15
1910,	288	12 5	10 1	2 4
1911,	322	12 13	10 18	1 14
1912,	354	12 4	10 9	1 15
1913,	47	11 12	9 11	2 1
Average of 1,399 tests,		12 5	10 6	1 19

The advantages of the system of sprouting seed of late varieties of potatoes are fully set forth in the Department's leaflet No. 58. These experiments, however, clearly show that an average increase in yield, due to sprouting, of approximately two tons per statute acre may be expected.

IV.—MANGELS.

A.—MANURIAL TEST (OLD SERIES).

The object of this series of experiments was to discover a simple and profitable method of manuring the mangel crop. The tests commenced in 1901, and were repeated each year until 1911, when the series was concluded. During the period indicated the experiments have been carried out:—

- (a) At 188 centres distributed over the whole country.
- (b) On a great diversity of soils.
- (c) With the principal varieties of mangels.
- (d) During seasons differing widely in character.

It may be claimed, therefore, that the figures obtained from experimental work of this scope—probably without a parallel—show, in the most convincing manner, the results that may generally be expected from the application to the mangel crop of the various manurial dressings included in the experiments under review.

It is obviously impossible in framing reports on experimental work of this magnitude to show the returns from individual centres in an easily readable form, nor does a careful analysis of the figures returned each year indicate that any very useful purpose would be served thereby. The results on different kinds of soil or in varying seasons have been remarkably uniform throughout, and the general summaries set forth in Tables I. and II. give an accurate idea of the effects of the different manurial dressings under most of the conditions likely to be met with in the growing of mangels in this country.

Experiments designed to ascertain the manurial requirements of mangels on pronounced peaty soils were commenced in 1913. The results of these tests are given on page 283.

Detailed results of the Old Series of experiments have been given in the Department's reports on Mangel Experiments for each of the years 1901 to 1909. Further, it has been the custom for each County Agricultural Committee to publish annually, detailed accounts of these experiments as carried out in their county. Thus farmers have always been enabled to peruse the general report for the whole country and also the results of tests made in their own county.

It is necessary to state that, when the experiments had been

carried out for the five years, 1901 to 1905, it was deemed advisable to modify slightly the original plan of the tests by increasing the amounts of some of the manures employed. Accordingly, in 1906, the following changes were introduced :—

(1) Farmyard manure was applied throughout at the rate of 20 tons instead of 15 tons per statute acre.

(2) Kainit was applied to Plot 5 at the rate of 4 cwt. instead of 2 cwt. per statute acre.

(8) An extra plot, No. 7, was included with the object of showing the effect of supplying the nitrogenous manure in the form of nitrate of soda applied in two top dressings, as compared with the use of sulphate of ammonia sown in the drills.

These slight modifications in no way prejudiced the original object of the experiments, but in order that the figures for each period may be strictly comparable, the summaries are shown separately in the following Tables :—

TABLE I.—Showing the General Average Results of 61 Experiments carried out during the five years, 1901-5.

Year.	Number of Experiments.	Plot 1. No Manure.	Plot 2. 15 tons Farm-yard Manure.	Plot 3. 15 tons Farm-yard Manure, 4 cwt. Super-phosphate.	Plot 4. 15 tons Farm-yard Manure, 4 cwt. Super-phosphate, 2 cwt. Sulphate of Ammonia.	Plot 5. 15 tons Farm-yard Manure, 4 cwt. Super-phosphate, 2 cwt. Sulphate of Ammonia, 2 cwt. Kainit.	Plot 6. 15 tons Farm-yard Manure, 4 cwt. Super-phosphate, 2 cwt. Sulphate of Ammonia, 4 cwt. Salt.
		Average yield per statute acre					B
		T. C.	T. C.	T. C.	T. C.	T. C.	T. C.
1901 . . .	6	15 8	26 11	27 13	31 0	33 11	36 11
1902 . . .	12	7 1	18 0	19 7	22 11	24 18	25 12
1903 . . .	11	3 2	16 5	17 13	23 12	24 6	25 10
1904 . . .	21	8 2	22 3	25 3	27 7	29 17	31 18
1905 . . .	11	3 14	16 13	19 8	21 3	23 13	24 10
Average yield . . .		7 6	19 14	21 17	24 19	27 2	28 13
Average Cost of Manures . . .		2 s. d.	2 s. d.	2 s. d.	2 s. d.	2 s. d.	2 s. d.
Value of Crop less Cost of Manures (Mangels at 10s. per ton) . . .		3 13 0	6 17 0	7 6 2	7 12 4	8 8 10	9 5 4

* Average of 56 Centres only.

TABLE II.—Showing the General Average Results of 127 Experiments carried out during the six years, 1906–1911.

Year.	No. of Experiments.	Plot 1. No Manure.	Plot 2. 20 tons Farm-yard Manure.	Plot 3. 20 tons Farm-yard Manure, 4 cwt. Super-phosphate.	Plot 4. 20 tons Farm-yard Manure, 4 cwt. Super-phosphate, 2 cwt. Sulphate of Ammonia.	Plot 5. 20 tons Farm-yard Manure, 4 cwt. Super-phosphate, 2 cwt. Sulphate of Ammonia, 4 cwt. Kainit.	Plot 6. 20 tons Farm-yard Manure, 4 cwt. Super-phosphate, 2 cwt. Sulphate of Ammonia, 4 cwt. Salt.	Plot 7. 20 tons Farmyard Manure, 4 cwt. Super-phosphate, 2 cwt. Nitrate of Soda (applied after thinning in two dressings).
				Average yield per statute acre				
		T. C.	T. C.	T. C.	T. C.	T. C.	T. C.	T. C.
1906 .	26	9 7	24 19	27 2	29 5	32 1	34 7	34 14
1907 .	35	10 18	25 15	26 17	29 15	32 15	34 5	32 19
1908 .	24	8 11	26 7	27 5	31 2	33 10	34 13	34 8
1909 .	14	7 16	24 4	25 11	27 19	30 5	30 16	30 15
1910 .	19	9 11	23 11	26 8	29 19	32 9	33 12	31 16
1911 .	9	8 14	24 2	26 5	30 12	34 4	35 10	36 5
Average Yield .		9 9	25 2	26 15	29 16	32 12	33 19	33 8
Average Cost of Manures . .		£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Value of Crop less cost of Manures (Mange's at 10s. per ton) .		—	4 0 0	4 12 4	6 1 8	6 12 8	6 7 8	6 2 8
		4 14 6	8 11 0	8 15 2	8 16 4	9 12 10	10 11 13	10 11 4

The effects of the various manurial dressings as indicated in the above Tables may be epitomised briefly as follows:—

(1) Comparing the returns from Plot 2 for each period, it is seen that a dressing of 20 tons of farmyard manure was more profitable than a dressing of 15 tons per statute acre.

(2) The application of 4 cwts. superphosphate on Plot 3 resulted in an average profit of 6s. 6d. per annum for the entire period.

(3) The addition of 2 cwts. sulphate of ammonia on Plot 4 resulted in an average annual profit of 3s. 6d. for the entire period.

(4) As regards the application of kainit on Plot 5, a dressing of 2 cwts. during the first period and of 4 cwts. during the second period gave identical results, viz., a profit of 16s. 6d. per statute acre.

(5) The application of 4 cwts. salt on Plot 6 gave an average annual return, in excess of Plot 4 (dressed with superphosphate and sulphate of ammonia) of £1 13s. and £1 15s. 6d. during the first and second periods, respectively.

(6) Two top dressings of 1 cwt. each of nitrate of soda on Plot 7 produced practically the same results as a similar quantity of sulphate of ammonia applied in the drills on Plot 6.

Conclusions.—The results of these experiments, and also those hitherto obtained from the New Series, the results of which are shown on pages 281-283, fully justify the advice given in previous reports, viz., that a thoroughly reliable manurial dressing for the mangel crop, which may be confidently expected to give a profitable return, consists of a liberal quantity of farmyard manure in conjunction with—

4 cwts. Superphosphate,	} per Statute Acre.
2 cwts. Sulphate of Ammonia,	
4 cwts. Salt,	

In case the crop is backward in growth or attacked by insect pests, a top dressing of 1 cwt. nitrate of soda after the mangels are thinned is recommended.

B.—MANURIAL TEST (NEW SERIES).

After the old series of manurial experiments had been carried out for a few years, the results indicated that, in addition to a good dressing of dung, a suitable mixture of artificial manures for the mangel crop was composed of:—4 cwts. superphosphate, 2 cwts. sulphate of ammonia, and 4 cwts. salt.

With a view to ascertaining whether the quantity of any of these three ingredients could, with advantage, be increased or reduced, a new series of experiments was devised in 1908. Each plot received a fixed quantity of farmyard manure, together with a mixture of artificial manures, in which the three ingredients were applied in varying quantities.

In 1913 this experiment was carried out on twenty-two farms in eleven counties.

For the sake of easy reference and comparison, the general average results for 1913 and the five previous years are briefly summarised in the following Tables:—

Varying quantities of Superphosphate.

Plot	Manures applied per Statute Acre.	1913. (22 Experiments).			Average for five years, 1908-12. (135 Experiments).		
		Average yield per Statute Acre.		Value of Crop after deducting cost of Manures.	Average yield per Statute Acre.		Value of Crop after deducting cost of Manures.
		T.	C.	£ s. d.	T.	C.	£ s. d.
2	3 cwts. Superphosphate with Dung, Sulphate of Ammonia and Salt, .	31	6	9 5 6	31	16	9 13 0
3	4 cwts. Superphosphate, do., .	32	15	9 16 6	33	5	10 4 3
4	5 cwts. Superphosphate, do., .	32	15	9 13 0	33	9	10 2 11

Varying quantities of Sulphate of Ammonia.

Plot	Manures applied per Statute Acre.	1913. (22 Experiments).			Average for five years, 1908-12. (135 Experiments).		
		Average yield per Statute Acre.		Value of Crop after deducting cost of Manures.	Average yield per Statute Acre.		Value of Crop after deducting cost of Manures.
		T.	C.	£ s. d.	T.	C.	£ s. d.
5	1 cwt. Sulphate of Ammonia, with Dung, Super- phosphate and Salt, .	31	8	9 18 6	31	19	10 5 10
3	2 cwts. Sulphate of Ammonia, do.	32	15	9 16 6	33	5	10 4 3
6	3 cwts. Sulphate of Ammonia, do.	35	7	10 7 0	34	10	10 1 10

Varying quantities of Salt.

Plot	Manures applied per Statute Acre.	1913. (22 Experiments).			Average for five years, 1908-12. (135 Experiments).		
		Average yield per Statute Acre.		Value of Crop after deducting cost of Manures.	Average yield per Statute Acre.		Value of Crop after deducting cost of Manures.
		T.	C.	£ s. d.	T.	C.	£ s. d.
7	2 cwts. Salt, with Dung, Super- phosphate and Sulphate of Ammonia, .	31	6	9 5 0	31	8	9 8 8
3	4 cwts. Salt, do. .	32	15	9 16 6	33	5	10 4 3
8	6 cwts. Salt, do. .	33	10	10 1 0	33	5	10 1 1

In 1912 an extra plot, No. 9, was included in the experiments with the object of showing the effects of the application of three-quarters of the amount of the standard dressing of artificials applied on Plot 3.

The following Table shows the returns obtained from dung alone, dung and three-quarters of the standard dressing of artificials, and dung with the full quantity of the standard dressing, respectively:—

Varying quantities of the Standard Mixture.

Plot.	Manures applied per Statute Acre.	1913.				1912.			
		(22 Experiments).				(22 Experiments).			
		Average yield per Statute Acre.		Value of Crop after deducting cost of Manures.		Average yield per Statute Acre.		Value of Crop after deducting cost of Manures.	
		T.	C.	£	s. d.	T.	C.	£	s. d.
1	20 tons Dung,	22	2	7	1 0	18	15	5	7 6
9	20 tons Dung, 7½ cwt. Stan- dard Mixture of Artificials (¾ dressing)	29	6	8	12 9	24	11	6	7 3
3	20 tons Dung, 10 cwt. Stan- dard Mixture of Artificials (Full dressing),	32	15	9	16 6	27	1	6	19 6

The most important points brought out by the foregoing results obtained under the conditions observed in carrying out these experiments are :—

(I.) That the most generally satisfactory dressing of superphosphate is 4 cwts. per statute acre. Three cwts. seems scarcely sufficient to meet the full requirements of the crop, whilst 5 cwts. is apparently more than sufficient in most cases.

(II.) That, after deducting the cost of the manures, the value of the crop from each of the three plots manured with sulphate of ammonia at the rate of 1 cwt., 2 cwts., and 3 cwts., respectively, was practically identical, as will be seen from the following figures which represent the average annual value of the crop for the whole period covered by the experiments :—

	£	s.	d.
Plot 5.—Dressed with 1 cwt. Sulphate of Ammonia	10	4	10
Plot 3.—Dressed with 2 cwts. Sulphate of Ammonia	10	3	2
Plot 6.—Dressed with 3 cwts. Sulphate of Ammonia	10	2	7

The inference to be drawn from these results is that whilst a profit may be obtained from an application of as much as 3 cwts. sulphate of ammonia, it is doubtful whether so large an outlay is desirable. A dressing of from 1 to 2 cwts. is calculated to give more uniformly satisfactory results under average conditions.

(III.) That 4 cwts. of salt is more generally suitable than either 2 cwts. or 6 cwts. per statute acre. Thus, each season the returns

from 4 cwts. of salt have been markedly better than those from 2 cwts. Again, in four seasons out of six, 4 cwts. gave better results than did 6 cwts. In the dry seasons of 1911 and 1913 there was a slight difference in favour of the heavy dressing of salt; probably this may be attributed to the retentive power of salt for moisture.

(IV.) That, as a rule, a distinctly greater profit is obtained from the full quantity of the standard mixture of artificials than from a smaller dressing of the same mixture.

The results of this series of experiments do not indicate the necessity for any modification of the recommendations given on page 280 regarding the application of artificial manures to the mangel crop.

C.—PRELIMINARY MANURIAL TESTS ON PEATY SOILS.

These experiments were designed with a view to ascertaining whether, in the case of pronounced peaty soils, it is desirable to modify the standard mixture of artificial manures generally recommended for the mangel crop.

During the past season, seven of these tests were carried out in six counties. The plan of the experiments, together with the results obtained at each centre, will be seen from the following Table:—

Centre.	Per-centage of Organic Matter and combined water in the soil : (Depart-ment's Analysis)	Plot 1.	Plot 2.	Plot 3.	Plot 4.	Plot 5.
		20 tons Farmyard Manure.	20 tons Farmyard Manure, 4 cwt. Superphos-phate, 2 cwt. Sulphate of Ammonia, 4 cwt. Kainit.	20 tons Farmyard Manure, 4 cwt. Superphos-phate, 1 cwt. Sulphate of Ammonia, 4 cwt. Kainit.	20 tons Farmyard Manure, 4 cwt. Superphos-phate, 4 cwt. Kainit.	20 tons Farmyard Manure, 4 cwt. Superphos-phate, 2 cwt. Sulphate of Ammonia, 4 cwt. Salt.
		T. C.	T. C.	T. C.	T. C.	T. C.
Rathmore, Co. Kerry	17.5	27 10	42 0	37 19	34 18	39 11
Newbridge, Co. Kildare	36.7	21 0	23 10	21 10	22 5	24 0
Blirr, King's Co.	26.3	23 4	34 17	32 10	32 14	32 5
Aghamore, Co. Mayo	20.8	27 14	34 4	32 17	31 0	33 15
Foxford, Co. Mayo	22.0	23 2	28 7	36 4	39 7	37 16
Boyle, Co. Roscommon	24.1	25 4	34 5	32 2	27 16	34 12
Kilrossenty, Co. Waterford	13.7	19 16	28 11	30 17	29 5	28 11
Average yield per statute acre,		23 19	32 5	32 0	31 1	32 19
Increase due to artificial Manures,		—	8 6	8 1	7 2	9 0
		£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Cost of Manures,		4 0 0	6 17 0	6 1 6	5 6 0	6 11 0
Value of Crop, less cost of Manures; (Mangels at 10s. per ton),		7 19 6	9 5 6	9 18 6	10 4 6	9 18 6

Whilst it would be unwise to draw deductions from such a limited number of experiments carried during one season only, the results, so far as they go, seem to indicate that sulphate of ammonia, especially if more than 1 cwt. per statute is applied, may fail to give a profitable return on many peaty soils.

It is hoped to continue these tests.

D.—VARIETY TEST.

These experiments, carried out in order to compare the relative cropping powers of different varieties of mangels, were conducted at thirty-three centres in sixteen counties.

The average results for 1913, together with those of the three previous years, 1910–12, are reproduced in the following Table :—

Variety of Mangel.	1913		1910–12	
	(33 Experiments)		(81 Experiments)	
	Average yield per		Statute Acre	
	T.	C.	T.	C.
Prize Winner	29	1	31	11
Yellow Globe	28	13	30	15
Long Red	24	19	28	10
Golden Tankard	23	3	24	4

In each of the four seasons under review, Prize Winner and Yellow Globe have given appreciably heavier crops than the Long Red and Golden Tankard varieties.

V.—OATS.

A.—MANURIAL TEST (OLD SERIES).

The object of this series of experiments was to test the effect of artificial manures when used singly and in combination on the oat crop. The experiments were commenced in 1901, and repeated each season until 1911, when the series was concluded. During the period mentioned the tests have been carried out:—

- (a) At 150 centres distributed over the whole country.
- (b) On a great diversity of soils.
- (c) With the most commonly grown varieties of oats.
- (d) During seasons differing widely in character.

Thus ample opportunity has been afforded of observing the effects of the various manurial dressings under practically all the conditions likely to be experienced by farmers in this country.

Detailed results of the experiments have been published from time to time by the Department, and by the various County Committees of Agriculture. It must suffice, therefore, in this report to present a comprehensive summary of the results for the entire period in as brief and readable a form as possible.

It should be stated that, during the first five years of the experiments, a plot dressed with kainit alone was included. Whilst the yield from this plot was slightly greater than that from the “no manure” plot, it was decided to discontinue the application of kainit alone, firstly, because the profit realised from such an application was very small,—in fact at some centres it resulted in a slight loss, and, secondly, because it is now generally understood that the most economical way to use potassic manures for cereals is in conjunction with nitrogenous and phosphatic manures.

The following Table shows the average returns for each season from the different plots, together with the general average figures for the complete series of experiments:—

TABLE I.—Showing the General Average Results of 150 Experiments carried out during the eleven years, 1901-11.

Year.	No. of Experiments.	PLOT 1.		PLOT 2.		PLOT 3.		PLOT 4.		PLOT 5.	
		No Manure.		1 cwt. Sulphate of Ammonia.		3 cwt. Superphosphate.		1 cwt. Sulphate of Ammonia, 3 cwt. Superphosphate.		1 cwt. Sulphate of Ammonia, 3 cwt. Superphosphate, 3 cwt. Kainit.	
		Average yield per Statute Acre.									
		Grain.	Straw.	Grain.	Straw.	Grain.	Straw.	Grain.	Straw.	Grain.	Straw.
		cwt. qr.	cwt.	cwt. qr.	cwt.	cwt. qr.	cwt.	cwt. qr.	cwt.	cwt. qr.	cwt.
1901	9	13 1	22	16 1	27	16 0	27	19 0	33	20 1	35
1902	9	17 0	30	19 3	34	18 0	33	21 1	36	23 0	40
1903	18	14 0	26	15 2	29	16 2	27	19 0	33	21 0	38
1904	17	15 1	28	18 3	34	18 0	30	21 1	37	22 3	41
1905	22	15 2	23	18 0	27	17 3	26	20 3	31	21 1	33
1906	12	15 2	25	18 3	32	17 3	30	21 3	40	22 1	42
1907	14	17 3	28	20 2	34	21 3	35	24 3	43	25 2	46
1908	10	16 0	27	18 2	32	18 0	30	21 2	36	22 0	37
1909	11	17 0	27	19 1	32	19 2	31	22 0	36	23 1	39
1910	15	17 2	29	20 0	35	20 1	34	22 2	38	24 2	45
1911	13	14 2	20	17 0	25	17 2	24	19 3	27	21 2	30
Average Yield.		15 3	26	18 1	31	18 1	30	21 0	36	2 2	39
Average Cost of Manures.		£ s. d. —		£ s. d. 0 13 8		£ s. d. 0 9 3		£ s. d. 1 2 11		£ s. d. 1 10 11	
Value of Crop, less Cost of Manures: Grain at 9d. per stone; Straw at 1s. 6d. per cwt.		6 13 6		7 2 4		7 5 3		7 17 1		8 2 7	

The showings of the figures set forth in the foregoing Table may be briefly summarised as follows:—

(1) That whilst the application of sulphate of ammonia alone on Plot 2, and of superphosphate alone on Plot 3, has, in each case, proved profitable on the whole, nevertheless, individual returns from both these plots have been variable, sometimes profitable, sometimes not.

(2) That the mixture of sulphate of ammonia and superphosphate used on Plot 4 was much more satisfactory than either manure applied alone on Plots 2 and 3.

(3) That throughout the experiments, the greatest profit and most satisfactory results were obtained from Plot 5, manured with the complete mixture including sulphate of ammonia, superphosphate and kainit.

B.—MANURIAL TEST (NEW SERIES).

From the commencement of the Old Series of Oat Manurial experiments, distinctly the best and most uniform results were obtained from the application of the complete mixture of artificials composed of 1 cwt. sulphate of ammonia, 8 cwt. superphosphate, 8 cwt. kainit. Whilst 1 cwt. sulphate of ammonia may be regarded as a very suitable dressing of nitrogenous manure, it was deemed advisable to obtain more definite information regarding the most suitable quantities of superphosphate and kainit, respectively, to use in conjunction with sulphate of ammonia. Accordingly, in 1908, a New Series of experiments was commenced to test the effects of applying different quantities of superphosphate and kainit.

The experiments were concluded in 1913 after being repeated during six consecutive seasons. The tests have been carried out at eighty-one centres distributed throughout the whole country.

The following Tables show the plan of the experiments and general summaries of results :—

VARYING QUANTITIES OF SUPERPHOSPHATE.

TABLE II.—Showing the General Average Results of 81 Experiments carried out during the six years 1908-13 :—

Year.	No. of Experiments.	PLOT 1.		PLOT 2.		PLOT 3.		PLOT 4.	
		No Manure.		1 cwt. Sulphate of Ammonia, 2 cwt. Superphosphate, 2 cwt. Kainit.		1 cwt. Sulphate of Ammonia, 3 cwt. Superphosphate, 2 cwt. Kainit.		1 cwt. Sulphate of Ammonia, 4 cwt. Superphosphate, 2 cwt. Kainit.	
		Average yield per Statute Acre.							
		Grain.	Straw	Grain.	Straw.	Grain.	Straw	Grain.	Straw.
1908,	6	cwt. 15 qr. 1	cwt. 19	cwt. 20 qr. 3	cwt. 28	cwt. 23 qr. 0	cwt. 31	cwt. 22 qr. 1	cwt. 30
1909,	17	14 2	23	22 1	36	22 1	37	22 1	37
1910,	14	15 0	26	19 3	37	21 3	37	22 2	39
1911,	13	13 2	20	17 3	23	19 3	26	19 1	26
1912,	18	17 2	31	21 1	40	22 2	42	23 2	43
1913,	13	15 2	25	20 2	33	21 0	36	21 1	34
Average Yield, 1908-13,		15 1	25	21 2	34	21 3	36	22 0	36
		£ s. d.		£ s. d.		£ s. d.		£ s. d.	
Average Cost of Manures.		—		1 7 0		1 10 4		1 13 8	
Value of Crop, less Cost of Manures; Grain at 9d. per stone; Straw at 1s. 6d. per cwt.		6 9 0		7 7 0		7 14 2		7 12 4	

VARYING QUANTITIES OF KAINIT.

TABLE III.—Showing the General Average Results of 81 Experiments carried out during the six years 1908-13 :—

Year.	No. of Experiments.	PLOT 1.		PLOT 2.		PLOT 5.		PLOT 6.	
		No Manure.		1 cwt. Sulphate of Ammonia, 2 cwt. Super-phosphate, 2 cwt. Kainit		1 cwt. Sulphate of Ammonia, 3 cwt. Super-phosphate, 3 cwt. Kainit.		1 cwt. Sulphate of Ammonia, 4 cwt. Super-phosphate, 4 cwt. Kainit.	
		Average yield per Statute Acre.							
		Grain.	Straw	Grain.	Straw	Grain.	Straw.	Grain.	Straw.
1908,	6	cwt. qr. 15 1	cwt. 19	cwt. qr. 23 0	cwt. 31	cwt. qr. 23 3	cwt. 31	cwt. qr. 23 0	cwt. 31
1909,	17	14 2	23	22 1	37	22 1	36	22 1	36
1910,	14	15 0	26	21 3	37	22 2	40	23 0	39
1911,	13	13 2	20	19 3	26	18 3	26	20 0	28
1912,	18	17 2	31	22 2	42	22 1	43	23 1	43
1913,	13	15 2	25	21 0	36	21 0	35	20 2	35
Average Yield, 1908-13.		15 1	25	21 3	36	21 3	36	22 0	36
		£ s. d.		£ s. d.		£ s. d.		£ s. d.	
Average Cost of Manures.		—		1 10 4		1 13 2		1 16 0	
Value of Crop, less Cost of Manures ; Grain at 9d. per stone ; Straw at 1s. 6d. per cwt.		6 9 0		7 14 2		7 11 4		7 10 0	

In 1912 an additional plot, No. 7, was included in the experiments to test the effect of applying 5 cwt. of the complete mixture of artificials as compared with that of the full quantity, 7 cwt., used on Plot 5.

The average results of this test for the two seasons 1912 and 1913 are shown in the following Table :—

VARYING QUANTITIES OF THE COMPLETE MIXTURE.

Plot.	Manure applied per Statute Acre.	Average Yield per Statute Acre, 1912-13 (31 Centres).		Value of Crop less cost of Manures.
		Grain.	Straw.	
1	No Manure	cwt. qr.	cwt.	£ s. d.
5	1 cwt. Sulphate of Ammonia	16 2	29	7 2 6
	3 cwt. Superphosphate	21 3	39	7 14 0
	3 cwt. Kainit			
	(Full dressing)			
7	5 cwt. of above mixture	21 0	36	7 15 0

It would appear from the results of the New Series of Experiments summarised in the foregoing Tables :—

(1) That the most generally suitable quantity of superphosphate is 3 cwt. per statute acre. In many cases 2 cwt. seems to be too light a dressing, whilst, on the other hand, as much as 4 cwt. is apparently unnecessary on land in average condition.

(2) That in most cases an application of 2 cwt. of kainit per statute acre is sufficient to meet the potash requirements of the Oat crop.

(3) That, under ordinary circumstances, from 5 to 6 cwt. of a complete mixture of artificials is a sufficiently heavy dressing for Oats.

The results of the New Series of experiments do not call for any notable modification of the advice given hitherto regarding the manuring of Oats. The differences between the returns from Plots 3 to 7, inclusive, are so small that, for all practical purposes, the manurial dressings used on these plots may be regarded as having given similar results. Any advantage there may be, probably lies with the lightest dressings applied on Plots 3 and 7.

In view of these considerations, therefore, the Department are of the opinion that the quantity of kainit previously recommended in the Standard Mixture, viz., 3 cwt., might be reduced to 2 cwt. per statute acre.

Conclusions.—The results of both the Old and New Series of experiments, indicate very clearly that whilst farmers cannot always rely on getting a profitable crop increase from the use of sulphate of ammonia, superphosphate or kainit, when applied alone, yet they may be confident of realising a profit when all three are used together in the following proportions :—

1 cwt. Sulphate of Ammonia,	} per Statute Acre.
3 cwt. Superphosphate,	
2 cwt. Kainit,	

It should be observed that this dressing is recommended chiefly for oats grown on poor lea land, or for oats following a corn crop. It might also be applied to oats sown after a root crop to which no farmyard manure was applied.

In addition to increased yield, the following advantages will be derived from the use of such a mixture of artificial manures :—Grain of decidedly superior quality is produced ; the plants braird better, and suffer less injury from attacks of insect pests, such as wireworms and leather jacket grubs ; the corn ripens earlier, so that it is ready for cutting sooner than would otherwise be the case.

VARIETY TEST.

This experiment was designed to test the cropping powers of certain newer varieties of oats as compared with old-established kinds, such as "Potato" and "Black Tartarian." In 1918, experiments were carried out at sixteen centres in nine counties. The average yields of grain and straw produced by each variety, together with the average yields of each variety, obtained in similar experiments for the seven years, 1906-12, are shown in the following Table :

Variety of Oat.	Average Yield per Statute Acre, 1913.		Average Yield, per Statute Acre 1906-12.	
	Grain.	Straw.	Grain.	Straw.
	cwt. qr.	cwt.	cwt. qr	cwt.
Black Tartarian,	21 3	34	22 2	35
Potato Oat	21 2	36	21 1	35
Yielder	21 2	31	—	—
Abundance	20 2	31	21 2	33
Banner	20 1	29	23 0	34
Waverley	20 0	29	23 0	34

VI.—TURNIPS.

A.—MANURIAL TEST (OLD SERIES).

Two series of experiments on the manuring of the Turnip crop were commenced in 1901, with the following objects :—

(1) To test the effects of artificial manures in combination with farmyard manure.

(2) To test the effects of artificial manures used alone.

The experiments were repeated each year until 1911, when the two series were brought to a close.

During the eleven years covered by the experiments, two hundred and thirty-eight tests in Series I., and one hundred and forty-seven tests in Series II., were carried out. The experiments were conducted in every county in Ireland, on a great diversity of soils and with the leading varieties of Swede turnips.

Detailed results of these experiments have been published each year in the Department's JOURNAL, and also in the annual reports issued by the various County Committees of Agriculture. This procedure has rendered unnecessary the reproduction of a large amount of data in this report.

As in the case of the Old Series of Field Experiments with other crops, the results of the manurial tests with Turnips are specially noteworthy for the uniformity each season.

MANURIAL TEST WITH FARMYARD MANURE.

TABLE I.—Showing a General Summary of the complete Series, including the Returns from 288 Centres during the eleven years 1901 to 1911 inclusive:—

Year.	Number of Experiments.	Plot 1.	Plot 2.	Plot 3.	Plot 4.	Plot 5.	Plot 6.
		No Manure.	10 tons Farmyard Manure.	20 tons Farmyard Manure.	10 tons Farmyard Manure, 4 cwt. Super-phosphate.	10 tons Farmyard Manure, 4 cwt. Super-phosphate, 1 cwt. Sulphate of Ammonia.	10 tons Farmyard Manure, 4 cwt. Super-phosphate, 1 cwt. Sulphate of Ammonia 3 cwt. Kainit.
		Average yield per Statute Acre.					
		T. C.	T. C.	T. C.	T. C.	T. C.	T. C.
1901 .	16	5 8	19 4	23 19	23 10	24 5	24 13
1902 .	14	5 14	17 14	22 16	23 9	25 12	27 6
1903 .	22	2 4	14 15	19 3	20 9	21 19	23 13
1904 .	33	5 15	22 4	26 6	27 0	28 16	29 7
1905 .	21	7 3	20 9	23 9	25 0	25 11	26 15
1906 .	28	6 15	20 4	23 10	24 11	24 13	25 15
1907 .	32	7 16	18 19	22 9	23 5	24 14	26 0
1908 .	26	7 14	19 0	21 18	22 15	24 1	24 5
1909 .	23	6 8	18 14	22 15	23 6	24 1	25 11
1910 .	15	7 12	19 1	22 16	23 2	23 18	25 8
*1911 .	8	6 9	18 13	20 6	24 2	24 4	24 5
Average yield. .		6 5	19 0	23 0	23 16	24 19	26 0
		£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Value of Crop: Turnips at 8s. per ton, .		2 10 0	7 12 0	9 4 0	9 10 5	9 19 7	10 8 0
Average Cost of Manures, .		—	2 0 0	4 0 0	2 12 4	3 6 0	3 14 0
Value of Crop, less cost of Manures, .		2 10 0	5 12 0	5 4 0	6 18 1	6 13 7	6 14 0

* In 1911, each of the manured plots in this series of experiments, except Plot 3, was dressed with 15 instead of 10 tons of farmyard manure, as was the case in previous years. Therefore the returns are not strictly comparable with those of the previous ten years, and, accordingly, the average yields for 1911 have not been included in the general average as set forth in the Table.

MANURIAL TEST WITHOUT FARMYARD MANURE.

TABLE II.—Showing a General Summary of the complete Series, including the Returns from 147 Centres during the eleven years 1901 to 1911 inclusive :—

Year.	Number of Experiments.	Plot 1. No Manure.	Plot 2 4 cwt. Super-phosphate.	Plot 3. 4 cwt. Super-phosphate, 1 cwt. Sulphate of Ammonia.	Plot 4. 4 cwt. Super-phosphate, 1 cwt. Sulphate of Ammonia, 3 cwt. Kainit.
Average yield per Statute Acre.					
		T. C.	T. C.	T. C.	T. C.
1901	7	4 10	19 8	22 9	23 14
1902	10	5 11	17 12	18 10	23 5
1903	20	2 2	14 7	15 1	18 16
1904	18	4 9	20 7	21 18	24 18
1905	12	9 3	19 1	19 10	22 7
1906	27	4 19	18 5	19 11	22 16
1907	19	4 13	15 3	16 19	19 19
1908	15	4 17	16 4	18 2	20 18
1909	8	3 10	18 5	20 1	21 13
1910	6	5 7	18 4	21 12	24 2
1911	5	7 6	19 1	20 14	23 19
Average yield.		4 17	17 9	18 19	22 0
		£ s. d.	£ s. d.	£ s. d.	£ s. d.
Value of Crop : Turnips at 8s. per ton,		1 18 10	6 19 7	7 11 7	8 16 0
Average Cost of Manures,		—	0 12 4	1 6 0	1 14 0
Value of Crop less Cost of Manures,		1 18 10	6 7 3	6 5 7	7 2 0

The principal showings of the foregoing Tables may be briefly epitomised as follows :—

Series 1.—(a) Comparing Plots 2 and 3 manured with 10 and 20 tons of dung respectively, it is seen that the heavier dressing increased the yield by 4 tons per acre. But even if the extra cost of applying the greater quantity of dung be neglected, the increase in yield of the crop failed to repay the cost of the additional manure, and a balance of 8s. per acre in favour of the lighter dressing is shown.

(b) A comparison of the average yields obtained from Plots 3 and 4 shows that where 4 cwt. superphosphate was used with 10 tons of dung, the yield was 16 cwt. greater than was obtained where dung was applied alone at the rate of 20 tons per acre. As the cost of the superphosphate was considerably less than that of the extra quantity of dung, the returns show a substantial profit in favour of Plot 4.

(c) On Plot 5 the addition of 1 cwt. sulphate of ammonia to the dressing of 10 tons of dung and 4 cwt. superphosphate applied on Plot 4 increased the yield by 1 ton 3 cwt. This increased yield, however, was produced at too great a cost to be profitable.

(d) The addition of 3 cwt. kainit on Plot 6 produced an increase in the yield of 1 ton 1 cwt. The value of this increase just paid the cost of the manure.

Series 2.—(a) Comparing the results from Plots 1 and 2 it is seen that the application of 4 cwt. superphosphate to Plot 2 produced an increase in the yield of 12 tons 12 cwt.

(b) On Plot 3 the application of 1 cwt. of sulphate of ammonia resulted in an increase of 1 ton 10 cwt. The value of this increase, however, was not sufficient to pay the cost of the manure.

(c) The heaviest average yield and the highest profit were obtained each season from Plot 4, manured with a complete mixture of artificials.

General Remarks.—It will be observed that in estimating the cost of the various manurial dressings which included farmyard manure, the full value of this manure has been charged to the turnip crop. The fact is well realised and appreciated by farmers that succeeding crops derive much benefit from a liberal application of dung to a root crop, and the above method of estimating the cost of the farmyard manure may be objected to on the ground that no allowance is made for the considerable "residual value" which dung undoubtedly possesses. However, in tabulating experimental data of this nature, a definite value—perhaps a little arbitrary—must be placed on the manures. This is necessary, because owing to the conditions under which these field experiments are carried out, it is impossible to estimate definitely the residual value of the manure. The Department wish it to be understood, however, that it is no part of their policy to under-rate the value of farmyard manure. On the contrary, the main object of their field experiments has been to indicate how the supply of farmyard manure, which is generally limited, may be best supplemented with artificial manures. The economic use of farmyard manure is a question which many farmers might consider more carefully, and it is hoped that the results of these experiments will stimulate thought upon the subject.

It is common knowledge that, as a rule, turnips can be grown more successfully by means of artificial manures alone than can either potatoes or mangels. The second series of experiments confirm this belief. It is not recommended that the practice be generally adopted, but the expedient may be resorted to in the event of there being insufficient farmyard manure for the whole of the root break. The best results will be obtained on land in good condition.

B.—MANURIAL TEST (NEW SERIES).

Two new series of experiments were commenced in 1908 with a view to testing :—

(1) The effect of an increased dressing of superphosphate (*a*) in combination with farmyard manure, and (*b*) in combination with other manures containing nitrogen and potash, as compared with the dressing of 4 cwt. per statute acre previously recommended.

(2) The effect of basic slag as compared with superphosphate when used in conjunction with farmyard manure and with artificial manures containing nitrogen and potash.

SERIES I.—DUNG AND ARTIFICIAL MANURES.

These experiments, in which the two phosphatic manures were applied in conjunction with dung, were carried out at thirty-six centres in twenty-two counties.

The general average results of Series I. Experiments in 1913, and the five previous years, are summarised in the following Tables for easy comparison and reference :—

(a) Varying Quantities of Superphosphate.

Plot	Manures applied per Statute Acre.	1913. (36 Centres.)		Average for 5 years, 1908-12. (177 Centres.)	
		Average yield per Statute Acre.	Value of Crop after deducting cost of Manures.	Average yield per Statute Acre.	Value of Crop after deducting cost of Manures.
		T. C.	£ s. d.	T. C.	£ s. d.
1	4 cwt. Superphosphate, with Dung,	22 8	5 5 2	22 19	6 4 1
2	5 cwt. Superphosphate do.	23 10	5 10 6	23 16	6 8 1
3	6 cwt. Superphosphate do.	24 2	5 11 10	24 9	6 10 10

(b) Varying Quantities of Basic Slag.

Plot.	Manures applied per Statute Acre.	1913. (36 Centres)		Average for 5 years, 1908-12. (177 Centres.)	
		Average yield per Statute Acre.	Value of Crop after deducting cost of Manures.	Average yield per Statute Acre.	Value of Crop after deducting cost of Manures.
		T. C.	£ s. d.	T. C.	£ s. d.
4	4 cwt. Basic Slag, with Dung.	23 4	5 11 7	22 17	6 4 8
5	5 cwt. Basic Slag do.	23 18	5 13 3	23 9	6 5 9
6	6 cwt. Basic Slag do.	24 12	5 15 10	24 6	6 9 1

A comparison of the average figures for the five years 1908-12, as shown in the foregoing Tables, indicates that, when varying quantities of superphosphate and basic slag, respectively, were applied with farmyard manure, the greatest difference in the value of the crops from any two plots, after deducting the cost of the manures, was not more than 6s. 9d. per statute acre.

SERIES II.—ARTIFICIAL MANURES USED ALONE.

The following Tables show the 1913 results in comparison with the average returns of the same experiments for the five previous years, 1908-12 :—

(c) Varying Quantities of Superphosphate.

Plot.	Manures applied per Statute Acre.	1913. (24 Centres)		Average for 5 years, 1908-12. (109 Centres.)	
		Average yield per Statute Acre.	Value of Crop after deducting cost of Manures.	Average yield per Statute Acre.	Value of Crop after deducting cost of Manures.
		T. C.	£ s. d.	T. C.	£ s. d.
1	4 cwt. Superphosphate, 1 cwt. Sulphate of Ammonia and 3 cwt. Kainit,	22 8	7 0 8	22 11	7 4 3
2	5 cwt. Superphosphate do.	23 12	7 6 10	23 12	7 9 3
3	6 cwt. Superphosphate do.	24 10	7 10 6	24 12	7 13 10

(d) Varying Quantities of Basic Slag.

Plot	Manures applied per Statute Acre.	1913. (24 Centres.)		Average for 5 years, 1908-12. (109 Centres.)	
		Average yield per Statute Acre.	Value of Crop after deducting cost of Manures.	Average yield per Statute Acre.	Value of Crop after deducting cost of Manures.
		T. c.	£ s. d.	T. c.	£ s. d.
4	4 cwt. Basic Slag, 1 cwt. Sulphate of Ammonia and 3 cwt. Kainit,	22 7	7 0 4	21 18	6 19 1
5	5 cwt. Basic Slag do.,	23 11	7 6 5	22 17	7 2 8
6	6 cwt. Basic Slag do.,	23 17	7 5 4	23 16	7 7 5

In 1912 an extra plot, No. 7, was introduced into this series of experiments, with the object of showing the effect of applying three-quarters of the amount of the standard mixture of artificials used on Plot 1. The results of this test for the past two seasons are shown in the following Table :—

(e) Varying Quantities of the Standard Mixture.

Plot	Manures applied per Statute Acre.	1913. (24 Centres.)		1912. (30 Centres.)	
		Average yield per Statute Acre.	Value of Crop after deducting cost of Manures.	Average yield per Statute Acre.	Value of Crop after deducting cost of Manures.
		T. c.	£ s. d.	T. c.	£ s. d.
1	4 cwt. Superphosphate, 1 cwt. Sulphate of Ammonia, 3 cwt. Kainit (full dressing).	22 8	7 0 8	21 9	6 13 1
7	6 cwt. of above mixture (three-quarter dressing)	20 17	6 18 0	20 1	6 11 7

The 1913 results may be summed up as follows :—

- (a) The application of extra quantities of superphosphate or basic slag has resulted in an increased average yield.
- (b) The value of this increase has, with one exception, viz., Plot 6, dressed with 6 cwts. basic slag (*see Table d*), more

than sufficed to repay the cost of the extra quantity of manure used.

- (c) The additional quantities of superphosphate and basic slag gave slightly more profitable returns when artificial manures were used alone than was the case when farmyard manure formed part of the manurial dressing.
- (d) Used in conjunction with farmyard manure, basic slag gave slightly better results than superphosphate; when artificials alone were applied, superphosphate gave a somewhat higher average yield than basic slag,
- (e) The application of the full quantity of artificials on Plot 1 gave slightly better returns than three-quarters the amount of the same mixture on Plot 7.

Conclusions.—The results of both the Old and the New Series of Experiments indicate :—

(1) That though good crops of turnips may be grown with farmyard manure alone, it is not economical to apply heavy dressings.

(2) That a medium dressing of farmyard manure, say from 10 to 15 tons per statute acre, supplemented by superphosphate or basic slag, is better than a heavy dressing of dung alone.

(3) That of the three kinds of artificial manures, nitrogenous, phosphatic and potassic, phosphatic manures alone materially increase the yield. When a medium dressing of dung supplemented by superphosphate or basic slag is used, it is very doubtful whether the addition of either sulphate of ammonia or kainit or both, will pay. But when no dung is used it is [advisable to apply these manures along with superphosphate or basic slag.

The use of a complete mixture has one decided advantage, inasmuch as a more even braird is obtained, the plants are stimulated in their early growth, and consequently suffer less injury from attacks of the turnip fly.

(4) That superphosphate and basic slag are practically of equal value as manures for turnips. The question as to which should be used to supplement dung must be decided by local circumstances, but where the land is deficient in lime, or where the disease "Finger and Toe" is prevalent, basic slag should undoubtedly be applied.

(5) That as much as 6 cwt. per statute acre of either manure may be used with satisfactory results. Especially is this the case when no farmyard manure is applied.

(6) That, under ordinary conditions, the following manurial

dressings may be thoroughly relied upon to give satisfactory results :—

(a) A medium dressing, from 10 to 15 tons, of farmyard manure supplemented with from 4 to 6 cwt. of superphosphate or basic slag per statute acre ; or

(b) The following dressings of artificials used without farmyard manure :—

4 to 6 cwt. of Superphosphate or Basic Slag,	} per Statute Acre.
1 cwt. Sulphate of Ammonia,	
3 cwt. Kainit,	

Basic slag must on no account be mixed with sulphate of ammonia.

C.—PRELIMINARY MANURIAL TESTS ON PEATY SOILS.

The object of these experiments, commenced in 1912, was to determine the best method of manuring turnips on peaty soils. The Table on page 301 shows the nature of the experiments and the results obtained during the past two seasons :—

Although the investigations have not yet reached a stage at which deductions can be drawn with certainty, it is worthy of note that in each of the two seasons, the most satisfactory results have been obtained from Plots Nos. 6 and 7 manured with artificials alone.

D.—VARIETY TEST.

The object of this experiment was to test the cropping powers of different varieties of swedes and yellow turnips.

Experiments were carried out at forty centres in twenty-one counties by Agricultural Instructors, and by Agricultural Overseers at thirty-two centres in Congested Districts.

The average results of these tests in 1913, and the three previous years, are given in the following Tables :—

County Experiments.

Variety.	Average yield per Statute Acre, 1913. (40 Centres.)		Average yield per Statute Acre, 1910-12. (65 Centres.)	
	T.	C.	T.	C.
SWEDES.				
Triumph,	24	16	24	2
Magnum Bonum,	24	9	24	5
Best of All,	24	4	24	7
Incomparable Green Top,	23	17	24	2
Improved Purple Top,	23	8	23	4
Elephant,	23	5	22	4
YELLOW TURNIPS.				
Centenary,	*30	17	30	19
Aberdeen Green Top,	*25	10	25	11

* Average of 33 Centres only.

Congested Districts' Experiments.

Variety.	Average yield per Statute Acre, 1913. (32 Centres.)	Average yield per Statute Acre, 1910-12. (111 Centres.)
	T. C.	T. C.
SWEDES.		
Triumph,	22 15	26 13
Best of All,	22 5	27 2
Magnum Bonum,	21 15	26 6
Abundance,	21 14	25 12
Whitsuntide Bronze Top,	21 13	25 12
Incomparable Green Top,	21 7	25 13
Improved Purple Top,	21 4	24 17

It will be seen from the foregoing Tables that both in the County and Congested Districts experiments, the swede varieties, Triumph, Magnum Bonum, and Best of All, gave the highest average yields in 1913.

These varieties have given consistently good yields during the past eight years, and may be regarded as three reliable general purpose swedes.

There is not much difference as regards the yields of the other swede varieties tested. Whitsuntide Bronze Top and Incomparable Green Top are good keeping swedes and worthy of trial.

Of the yellow turnip varieties, Centenary has almost uniformly produced heavier crops than Aberdeen Green Top in each of the eight years 1906-13. Centenary should be used early.

MANURIAL TEST ON PEATY SOILS.
Table showing the Returns per Statute Acre from each Centre.

CENTRE.	Percentage of Organic Matter and Combined Water in Soil : Department's Analysis.	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5	Plot 6	Plot 7
		15 tons Farmyard Manure.	15 tons Farmyard Manure. 4 cwt. Superphosphate.	15 tons Farmyard Manure. 4 cwt. Basic Slag (high grade).	15 tons Farmyard Manure. 4 cwt. Superphosphate. 2 cwt. Kainit.	15 tons Farmyard Manure. 4 cwt. Basic Slag (high grade). 2 cwt. Kainit.	4 cwt. Superphosphate. 1 cwt. Sulphate of Ammonia. 3 cwt. Kainit.	4 cwt. Basic Slag (high grade). 1 cwt. Sulphate of Ammonia. 3 cwt. Kainit.
		T. C.	T. C.	T. C.	T. C.	T. C.	T. C.	T. C.
1912.	Culclaff, Co. Donegal, . . .	24 5	31 0	32 10	32 10	30 5	33 10	26 15
	Lixnaw, Co. Kerry, . . .	22 4	25 10	25 14	27 3	25 4	22 6	22 4
	Allenwood, Co. Kildare, . .	19 3	21 10	23 2	25 0	23 0	16 5	20 0
	Ballycommon, King's Co., . .	5 15	10 7	18 2	18 11	21 18	19 9	21 11
	Tullamore, King's Co., . . .	5 12	8 18	9 6	14 11	14 7	14 19	17 9
1913.	Irvinestown, Co. Fermanagh, .	17 11	21 6	21 3	21 0	20 15	18 8	19 15
	Lisselton, Co. Kerry, . . .	26 0	27 14	27 9	29 14	28 6	28 11	28 0
	Rathmore, Co. Kerry, . . .	15 3	21 17	21 9	21 0	20 5	20 14	21 17
	Robertstown, Co. Kildare, . .	28 0	21 10	20 5	21 0	20 5	23 5	21 0
	Manorhamilton, Co. Leitrim, .	23 5	19 19	19 13	22 19	20 13	21 12	21 2
	Glencar, Co. Leitrim, . . .	14 7	19 11	19 18	21 8	19 17	20 1	19 17
	Tannamore, Co. Tyrone, . . .	25 6	29 9	28 17	31 9	28 17	28 5	27 3
	Omagh, Co. Tyrone, . . .	18 3	19 19	20 3	20 16	20 14	21 18	22 4
	28 8	15 8	19 9	21 15	23 11	22 19	21 6	21 12
Average Yield per Statute Acre, Increase due to Artificial Manures, . . .	1912	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
		3 0 0	3 14 0	3 14 0	4 0 0	4 0 0	1 18 6	1 18 6
		3 3 2	4 1 7	5 0 0	5 8 5	5 3 7	6 11 11	6 14 4
Cost of Manures, Value of Crop, less Cost of Manures : Turnips at 8s. per ton, . . .	1913	T. C.	T. C.	T. C.	T. C.	T. C.	T. C.	T. C.
		18 8	22 13	22 7	23 13	22 16	22 17	22 12
		£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Average Yield per Statute Acre, Increase due to Artificial Manures, . . .	1913	3 0 0	3 14 0	3 14 0	4 0 0	4 0 0	1 18 6	1 18 6
		4 7 2	5 7 2	5 4 10	5 9 2	5 2 5	7 4 4	7 2 4
		4 7 2	5 7 2	5 4 10	5 9 2	5 2 5	7 4 4	7 2 4

VII.—WHEAT.

The object of the experiments in wheat cultivation conducted this year was to ascertain the value and general suitability of the four varieties—Red Fife, Burgoyne's Fife, Red Chaff White, Queen Wilhelmina.

The two varieties of Fife represent what may be termed "strong" wheats or wheats of high milling quality; Red Chaff White although of lower "strength" is a variety generally acceptable to millers, while Queen Wilhelmina is a heavy yielding white variety of inferior quality to the three others.

In order to ascertain the value of the four varieties on different soils two centres exhibiting strong contrasts in this respect were chosen. The soil at the Albert Agricultural College Farm may be described as a strong loam, while that at the other centre, Bagenalstown, is a light gravelly loam with gravelly sub-soil. The size of each plot at both centres was one statute acre.

The results obtained are shown in the following Table :—

Centre.	Red Fife.		Red Chaff White.		Burgoyne's Fife.		Queen Wilhelmina.	
	Brls.	Stns.	Brls.	Stns.	Brls.	Stns.	Brls.	Stns.
Albert Agricultural College, Glasnevin	12	3	12	10	13	1	16	14
Brown & Crosthwait, Bagenalstown	8	7	8	11	8	10	11	10
Average yield of good corn per statute acre.	10	5	10	11	10	15	14	2

Comparing the two Fifes and Red Chaff White first, it will be seen that there is only a small difference between them in regard to yield. It will be noticed that these remarks apply to the results at both centres. In point of quality, Red Fife is the highest, and closely followed by Burgoyne's Fife; Red Chaff White is inferior to both, and as its yielding capacity is only equal, it is probably a less profitable variety to cultivate.

Queen Wilhelmina produced remarkably good crops at both centres. It is inferior in quality to the three other varieties, but its high productivity on soils varying so much as the two under review, makes it a variety to which the attention of wheat growers may be safely directed.

This is the first year in which the plots of Red Fife and Red Chaff White have been sown with pedigreed seed; the evenness of the crops when growing, in ripening and in the grain when threshed, marks a distinct advance on that of past years. The desirability of sowing only *pure pedigreed* seed cannot be too strongly insisted on.

The experience gained in this and previous seasons shows that Red Fife and Burgoyne's Fife produce the best crops when sown in the spring. Red Fife is an exceptionally poor tillerer, and it is, therefore, necessary to sow more seed of this than of the heavier tillering varieties; on most soils 18 stones per statute acre is not too great a quantity of seed. Queen Wilhelmina and Red Chaff White should be sown in the autumn, but the latter, on light soils, may be sown up to the end of February.

Copies of these reports in leaflet form (Nos. 36 to 41 and 61) may be obtained, free of charge, and post free, on application to the Secretary, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion Street, Dublin. Letters of application so addressed need not be stamped.

SOME NOTES ON SWEDISH FORESTRY.

Of the total quantity of timber imported into the United Kingdom in 1912, over 1,200,000 loads, representing over 20 per cent. of the sawn timber imported in the

Importance of shape of deals, battens, boards, firewood, etc., **Swedish Forestry.** came from Swedish ports. In addition to these imports, large quantities of pitwood, joinery, wood pulp, etc., are derived from Swedish forests, so that the wood supply of Great Britain and Ireland, so far as ordinary building timber is concerned, is closely related to the condition and management of Swedish timbered lands and their future development. The following features regarding Swedish forestry, therefore, may be of economic, as well as technical, interest, as bearing upon the timber supply of the future, and the probability, or otherwise, of a shrinkage in imports and an increase in prices, due to forest exhaustion in Northern Europe.

Sweden occupies the eastern half of the Scandinavian Peninsula being bounded by Norway and the Strait known as the Cattegat on the west and the Baltic Sea and Gulf of Bothnia on the east, the short north-eastern boundary line above the Gulf adjoining Finland. The frontier between Norway and Sweden follows the watershed of a chain of mountains falling from 5,000 to 7,000 feet above sea level at the highest points to the level of the Baltic and Bothnian Gulf across a strip of country about two hundred miles wide, so that the greater part of the kingdom may be regarded as lying on an eastern slope and more or less protected against westerly winds. This slope is deeply

Physical Features indented and scored by numerous rivers flowing **and Climate.** in a south-easterly direction, giving an imaginary section cut through the centre of the country from north to south a ridged or corrugated appearance. South of Stockholm the country is generally flat and low-lying, with numerous lakes, except where a tract of mountain land, known as the Smaland Highlands, rises to 1,000-2,000 feet south of Lake Vettern.

The soils of Sweden are practically all glacial or post-glacial below the 1,000-2,000 feet contour lines, the granite, gneiss, and other primary rocks of the central chain being covered with drift and boulders to a considerable depth, through which the rivers cut their way to a depth of 200-300 feet. A peculiarity of the Scandinavian Peninsula is the slow elevation of the land at the rate of about $1\frac{1}{2}$ -8 feet in a century, tending to increase the land surface and the rate of fall of the rivers.

The climate is generally characterised by a short but fairly dry and warm summer, with a long, cold winter. During June and July

SOME NOTES ON SWEDISH FORESTRY.

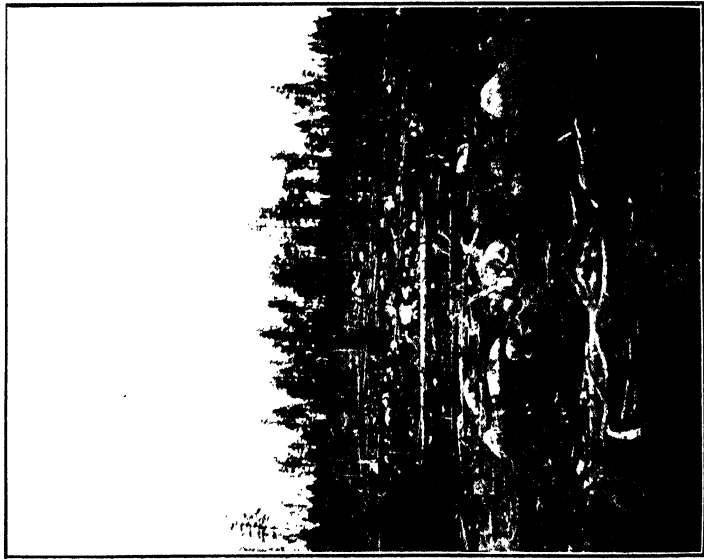


Fig. 1—View in Pine forest, burnt over about 1840.

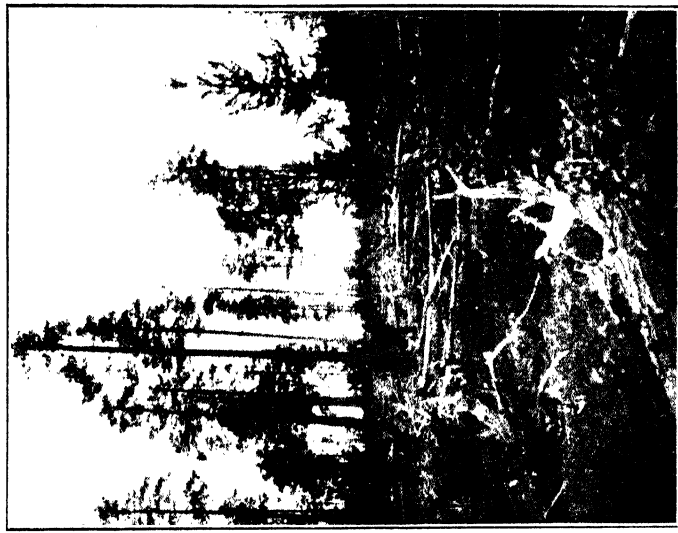


Fig. 2—View in forest near Gellivare, Norrbotten.

SOME NOTES ON SWEDISH FORESTRY.



Fig. 3—Northern type of Scots pine north of the Arctic Circle.

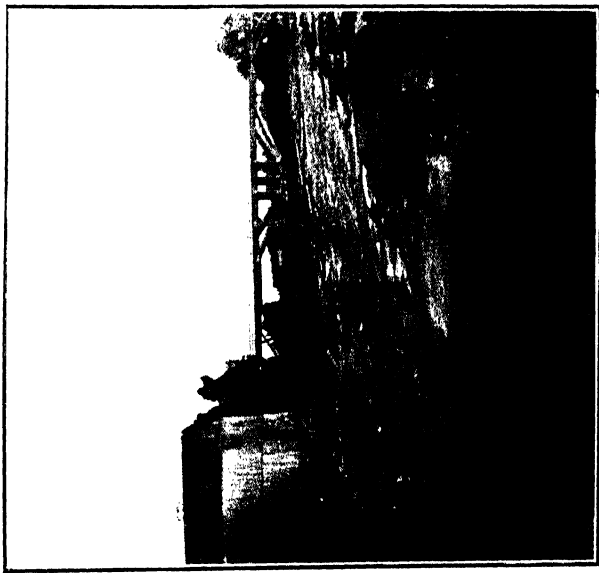


Fig. 4—Floating logs in Ranea river, near Lulea.

the northern half of the country enjoys almost continuous daylight, and growth, when once commenced, proceeds rapidly for a few weeks. These conditions, combined with a general absence of late frosts and strong winds, favour the growth of the hardier conifers to a remarkable degree, and the straight stems and small crowns produced by pine and spruce, both above and below the Arctic Circle, give these species, when grown in that region, qualities they seldom possess when found in other parts of Europe.

July mean temperatures range from 50° Fahrenheit at the higher elevations to 60° Fahrenheit in one or two places south of Stockholm. As only a comparatively narrow strip of the country possesses a July mean below 55° Fahrenheit, the summer is generally warm enough to enable trees to reach timber size at elevations of 2,000 to 3,000 feet above sea level.

Winter temperatures below the zero of Fahrenheit are general over the whole country, and the tree flora is necessarily limited to hardy species.

Rainfall occurs chiefly during the late summer and autumn, snow taking its place during the winter. The annual falls vary from 20 to 30 inches over the greater part of the country, being as low as 15 inches at some stations and up to 35 inches at others.

The total forest area of Sweden is estimated at about 50,000,000 acres, but this can only be regarded as approximate, as large tracts in the north are so thinly and irregularly stocked,

The Forests of Sweden. that exact classification is scarcely possible. So far as statistics go, however, the total forest area is roughly divided as follows :—

	<i>Acres.</i>	<i>Acres.</i>
Crown Parks	12,000,000	
Unsurveyed Forests	1,500,000	
Domain Forests	450,000	
Miscellaneous	50,000	
	<hr/>	14,000,000
Forests leased to Mines, Sawmills, etc.	500,000	
Forests of Public Institutions, Churches, etc.	1,000,000	
Forests attached to Crown Farms . .	3,000,000	
	<hr/>	4,500,000
Communal and Parish Forests . .		1,500,000
		<hr/>
		20,000,000
Private Forests		30,000,000
		<hr/>
TOTAL		50,000,000

With the exception of the private forests, the whole of the above area is practically under the control of the Forest Service, which is empowered to regulate fellings, and enforce regenerative measures. Of the total area, a considerable extent of rocky and unproductive ground, interspersed with peat bogs, exists, so that the exact area of timber producing ground is not known.

For general administrative purposes Sweden is divided into thirty forest districts, in each of which a *Jag-Mästare*, or forest officer is stationed, whose duties are chiefly those of regulating the felling of timber on Private, Communal, and State Forests throughout the district. So far as private forests are concerned, felling is not generally interfered with, provided measures are taken for re-stocking cleared ground, the owner being subject to a replanting law, which compels him to re-sow or plant all cleared areas, and to keep the ground permanently under forest, unless special reasons exist for its being otherwise treated. To enforce this law, an owner must deposit a sum equal to the cost of replanting the land, before he is allowed to clear-fell an area.

The communal forests are subject to much closer control, and in these the main idea is to keep up a regular supply of timber, and annual fellings are regulated accordingly.

In addition to communal forests, which are owned by every town and village throughout Sweden (the proceeds of which go towards the upkeep of roads, schools, and to other purposes for which local rates are usually levied), a large area of forest land is owned by, or attached to, the farms scattered throughout the country. The produce of this latter forest land is used chiefly for fuel and building purposes, and without it neither of these materials could be obtained at reasonable rates. In the past, many of these farm forests have been sold to large timber companies, whose sole object was to exploit the timber, and leave the land in a more or less derelict condition. Laws have now been passed which prevent any sales of farm forests to timber companies, the object of the Government being to ensure that the necessary quantities of fuel and timber should be assured to future cultivators of the soil.

The Crown Parks or forests are the chief areas on which intensive forestry is adopted, and for some years back the stock of mature timber on them has been carefully husbanded, while re-sowing or planting is more or less general. These Crown Parks are gradually being converted into areas similar to those found in State forests in most parts of Europe. In some cases, especially in the north, where the population is thin and scattered, they are far too large to be dealt with on intensive lines, containing, as they sometimes do, from 50,000–100,000 acres. On these immense areas natural regeneration is chiefly depended upon for re-stocking the ground; but where fires have repeatedly swept over the soil and destroyed

SOME NOTES ON SWEDISH FORESTRY.

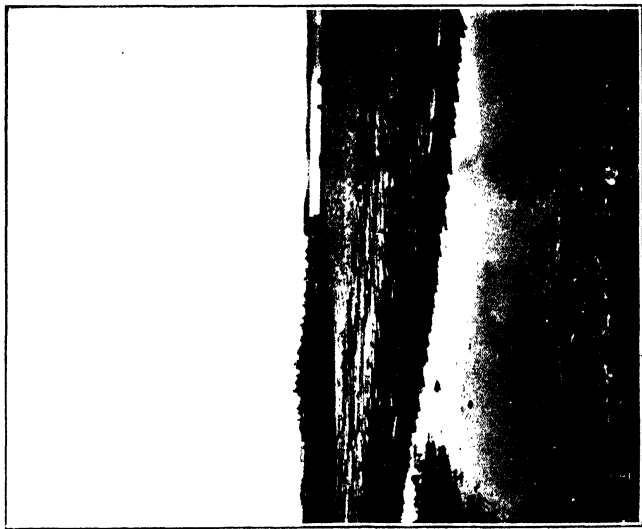


Fig. 5—Timber pond at Kalixfors Mill, owned by the Baltiska Timber Co.

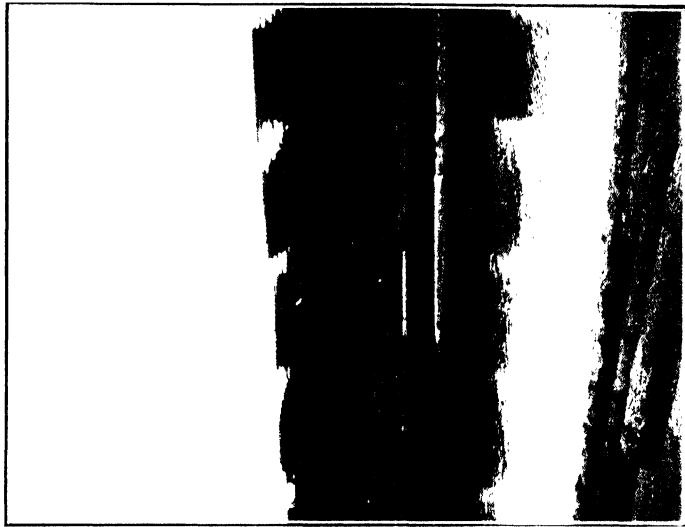


Fig. 6—Piled logs belonging to the Baltiska Co.

SOME NOTES ON SWEDISH FORESTRY.

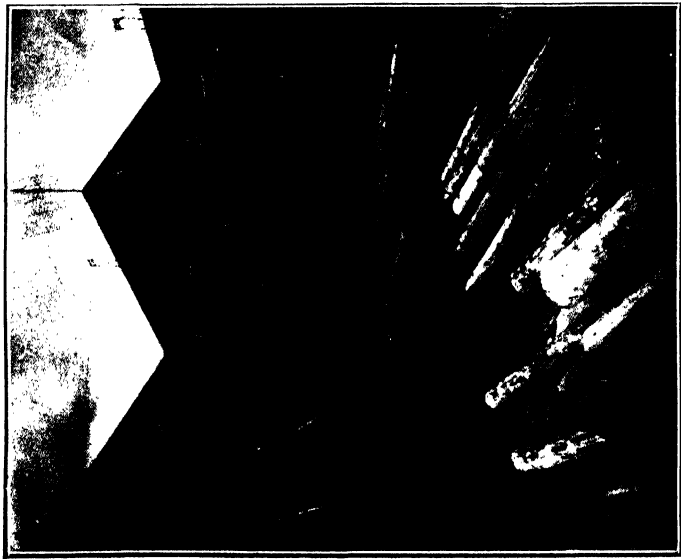


Fig. 7—Logs entering mill at Skutskar, near Gefle.

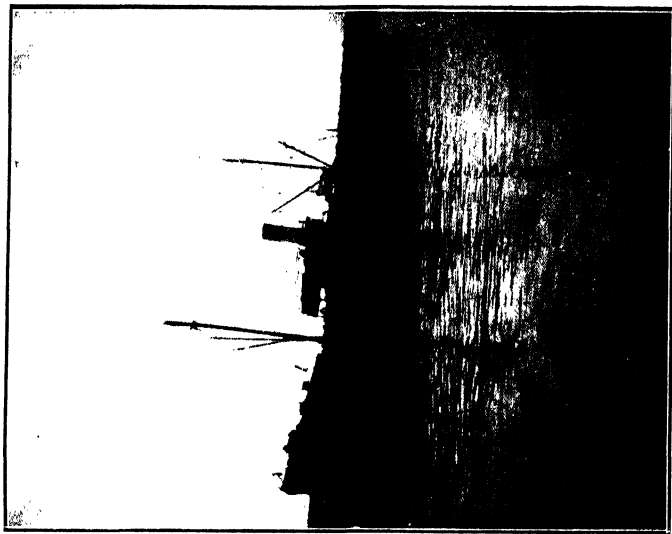


Fig. 8—Loading sawn timber in Gulf of Bothnia.

the humus and vegetable matter, killing many of the seed trees, the surface often becomes an unsuitable medium for seed to germinate in, and many years elapse before anything approaching a crop is produced. Seed sown on dry, sandy surfaces may lie in the ground for three or four years before germinating, and the growth of the seedlings for the first few years is very slow.

In the south and central parts of Sweden the bulk of the forests are owned privately, or by Sawmill or Mining Companies, Communes, etc. These private forests show the same variations in condition and management as may be noticed in most parts of Europe. Most of them lie in the more fertile parts of Sweden, and are capable, with good management, of giving high returns, and it is probable that they will play an important part in the future timber supply of the country when the wasteful methods of the past have given place to modern silviculture.

Forests belonging to Mines, Sawmill Companies, and Public Institutions are all under conservative management, and subject to a modified form of State supervision. They are usually managed by skilled and highly trained officers, and, running into tens of thousands of acres, and being owned by Companies whose interests are bound up in the future supply of timber, their management is gradually becoming more intensive. One of the oldest and largest Mining Companies in Sweden, the Kopparbergs Company, owns from 500,000 to 1,000,000 acres of forest in Dalecarlia, the general management of which is quite as good as that of any of the State forests.

Since 1903, what are known as Forest Conservation Boards have been established in the various "lans" or counties. These Boards consist of three persons—appointed by the Government, the county, and the local Agricultural Society, respectively. Their duties are connected with the general regulation of the private forests and forest property in each county, and they are appointed for three years. They are empowered to frame regulations for the regeneration of forests by natural or artificial means, and to prohibit felling likely to affect injuriously the productive capacity of the forests. Legal proceedings can be taken against owners neglecting to observe the regulations in force, these proceedings being undertaken by a Commission working in conjunction with the Board, and the expenses of this more or less popular control are met by export duties on timber and wood pulp, amounting to 2*d.* to 4*d.* per ton on timber, and 4*d.* to 8*d.* per ton on pulp. It is evident from these regulations that the Swedes have taken their forest wealth seriously, and realise the fact that the soil and climatic conditions of that country render timber production the most advantageous way of utilising the land. Another law of importance in preventing reckless felling of the forests in the north of the country is that

known as the Lapland Law, which prohibits the felling of trees below a certain diameter in Norbotten and Vesterbotten. This law is intended to prevent clearings being made which might adversely affect the shelter which forests now afford in these districts. Dead trees, are, however, exempt from the provisions of this law.

Practically the whole of the forests in the north and central parts of Sweden are composed of four species: Scots Pine, Spruce, Birch, and Aspen. Oak and Beech are found in the south, but in comparatively limited quantities, and so far as their economic importance is concerned, Scots Pine and Spruce are the predominating trees in the north, and at higher elevations generally, these two species usually occur in groups, the Pine on the higher and better drained soils, and the Spruce on the wet and swampy spots.

The density of the forest crops is usually good where the conditions for natural regeneration are favourable. In many districts the trees have attained an age at which seed production is light, and occurring at long intervals, and in these regeneration often takes place very slowly and irregularly. Throughout central and southern Sweden regeneration of Pine and Spruce presents no difficulties, and dense crops of all ages may be seen which have had no artificial assistance whatever, beyond protecting them from fire, grazing animals, etc.

Spruce has spread into Sweden from Finland during comparatively recent times, and has a tendency to take the place of the pine in natural mixtures, owing to its better shade-bearing qualities. This can be easily remedied in thinnings, however, and as small spruce can be used in pulp mills, the removal of this species is advantageous in more ways than one.

Along the shores of the Baltic and Gulf of Bothnia, grey and Black alder occupy the surface, while common ash, elm, maple, and lime occur more or less generally in the south and centre of the country.

The practice of planting on the lines adopted in Great Britain has not reached any great development in Sweden as yet. The more usual method is to sow in drills or patches, using about 6 lbs. of seed to the acre, Scots Pine and Spruce being often mixed. The ground is often prepared by grubbing the surface over with a grubber or strong plough, and considerable attention is now being paid to drainage. The total cost of this work rarely exceeds £2 to £3 per acre, and the results are, on the whole, fairly satisfactory. This is due rather to the absence of dense ground vegetation, rabbits, and other influences which render replanting operations so difficult,

than to the excellence of the methods themselves. These sown areas are occasionally filled up by planting trees in the thin spots, but otherwise very little attention is paid to them until the time for the first thinning arrives. Nursery development in Sweden can, as yet, scarcely be said to exist, although a beginning has been made in many centres, and will doubtless be extended as time goes on.

In general the management of forests through Sweden has been of a more or less exhaustive character. Probably owing to the abundance of natural seedlings which spring up

Methods of on all ground cleared in the vicinity of forests,
Management. the need for replanting or sowing has not been recognised. The system generally adopted has been that of taking out all marketable timber above a certain size, leaving the younger and smaller trees to mature, and the gaps or bare places to be filled up by natural seedlings. In many cases this method has produced excellent results, especially where a dense crop has previously stood on the ground and the seedlings, after thinning of the old trees, have been able to compete successfully with the surface vegetation which springs up when light is admitted to the ground. But in the north, and at high elevations generally, the scarcity of seed trees already referred to has resulted in a smaller production of young crops than was expected, and the ground has become gradually covered with a thick growth of *Vaccinium*, bearberry, and other surface growths, which almost entirely prevent the springing up of seedlings in adequate quantities. To remedy this condition of things, sowing or replanting has commenced, but its adoption cannot be regarded as general at present. This is possibly due, not so much to the lack of interest or recognition of cultural methods, but to the scarcity and dearth of labour in the more isolated districts. In the larger forests, labourers cannot be obtained in anything like the required numbers, and forest workers have usually to be accommodated in huts for weeks at a time, and paid wages varying from 5s. to 7s. 6d. per day.

Another weak point in the management of many Swedish forests is the free-thinning adopted at a comparatively early age, and which in many parts of Europe would lead to the entire destruction of the woods. This thinning is, of course, principally carried out for purposes of revenue, but is also intended to increase the growth of timber of the remaining trees as quickly as possible. Owing to the absence of wind, the results are certainly not so disastrous as an experienced forester in most parts of Europe would anticipate. Wind damage is not altogether absent, but the blowing down of thousands of trees by gales is almost unknown, and one might travel for miles without noticing a single tree which has been overturned by the wind.

As a general rule, little thinning takes place before the trees are 40–50 years of age, by which time they have reached, on favourable sites, a height of about 60 ft., and a mean diameter of 6 in. to 12 in. The dead trees and smaller thinnings are usually converted into charcoal on the spot, the larger timber being carted or floated to the sawmills. After this thinning, cuttings take place at intervals of 10 to 20 years, according to the area of forest to be worked over, and it is during this latter stage that the woods either renew themselves, or become gradually denuded of timber, necessitating clearing and replanting on modern European lines.

It is generally found that Spruce comes up thickly on the damp places, Scots Pine confining itself chiefly to dry hillocks. With both of these species Birch comes up freely to begin with, and for the first twenty or thirty years may form the bulk of the crop. After that stage, the Pine or Spruce generally gets ahead, and by the fiftieth or sixtieth year the forest has become, by suppression of the Birch and by the removal of that species in thinnings, an almost pure Pine or Spruce forest as the case may be.

The age at which the timber is cut varies to a considerable degree. While trees of 100 to 200 years of age are not uncommon, a great deal of the timber which now comes on to the market is comparatively young and immature, and deficient in many of the qualities for which the best brands have received a world-wide reputation. How long the supply of mature timber will last throughout Sweden is an important question, and one which has exercised the minds of Swedish foresters for a considerable time back. While the general impression prevails that the supply of timber in the country has not seriously diminished, there can be little doubt in the mind of any impartial observer that slower consumption must either occur during the next half century, or a larger proportion of immature timber be put on the market. The time necessary for Pine to attain a diameter of 9 inches at 15 feet from the ground (the size at which it is considered fit for the mills), varies in different parts of the country. In the north it is calculated that 120 to 150 years are required for this size to be reached, while 70 to 100 years may be the average period in the south and central parts of the kingdom.

An inducement to cut early is the enormous development of pulp manufacture in Sweden. Trees which at one time were useless or only fit for fuel or charcoal, can now be converted into pulp, and the temptation is, consequently, to cut this class of timber in preference to leaving it to mature in the course of another half century, when the present owners or shareholders of pulp mills will be elsewhere.

One of the most interesting features of Swedish forestry is the system of removing logs from the forest to the sawmills. This is simplified and cheapened by the numerous rivers which intersect almost all forest lands. During the winter months, when the ground is covered with snow, the trees are removed by dragging or sledging to the nearest suitable stream, and the following spring the trees are launched upon their journey to the sawmills, which may be 200 or 300 miles away. For these floating operations, all the more important rivers have been prepared, at an enormous cost, by the provision of booms, masonry, and timber work necessary for collecting the logs at certain points and keeping them in the floating channel at various spots at which they would, under ordinary circumstances, become jammed and obstructed in their journey. This work is supervised by Floating and Sorting Companies, who charge a certain sum per log to the various mills with whose timber they deal. The cost of floating varies according to the distance and other circumstances, but may be put down on an average at between 2*d.* to 3*d.* per log, for a distance of probably 200 to 300 miles. Wherever the rivers run into lakes enormous sorting booms are constructed, which intercept the logs as they come down and enable them to be sorted out according to the different owners' marks stamped on them after felling. This sorting takes place during the summer months, each boom being divided up according to the number of mills concerned in the ownership of the timber. The sawmills are usually placed round the edges of the lakes, and the logs are carried directly to them by tugs which can move thousands of logs several miles across a lake from one point to another. When they reach the mill for which they are intended, they are usually piled up into large floating stacks, the bottoms of which are submerged for a considerable distance below the surface of the water, while the upper portion of the stack may be 20 or 30 feet high. This stacking is necessary for providing the mills with logs during the winter months, when loose, floating logs would be imbedded in ice. From the booms the logs are usually drawn up by endless chains into the mills, where they pass, by the same means, on to the saws, the sawn timber being carried out on the opposite side.

Some of the larger mills have as many as 30 or 40 frame saws running continuously night and day, and require from one to two million logs per annum to keep them running, giving employment to 300 to 600 men.

After being sawn into deals, battens, boards, etc., the wood is carried to huge drying and sorting depots, where it is trimmed, graded, branded, and placed into stacks to dry for two or three months. The timber is then ready for shipment to any part of the

world, and on the Baltic, where the shore waters are extremely shallow preventing large vessels getting in except at regular ports or quays, the timber is usually carried in large covered lighters to the vessel anchored out in deeper water.

One feature noticeable in the timber now being converted is the comparatively small size of the logs, especially in the south and central parts of the country. A good deal of large timber is still obtainable in Finland, and most of the mills in the upper Gulf obtain a fair proportion of their supplies from that country. Very few of the logs seen in several mills visited by the writer in Dalecarlia would have a mean diameter of more than 1 foot, and a large number were scarcely above the pit-prop size, as known in this country.

As regards values, good Pine timber, growing in fairly accessible places, is valued at about 6 to 7 kroner per cubic metre, equal to about 3*d.* per cubic foot in Great Britain. Much of the smaller and inferior timber would be valued lower, and it is difficult to ascertain the exact price per cubic foot paid throughout the country, valuations usually being made per log, or per hectare.

Up to within recent years, Spruce has been generally lower in price than Pine, but owing to the development of pulp manufacture, things have now been altered in this respect, and the former is becoming as valuable as, if not more valuable than, the more durable Pine timber.

As an up-to-date Pulp Mill will turn out from 30 to 40 tons of mechanical pulp in 24 hours, and it is calculated that :—

50 cubic feet of round timber produce one ton of wet pulp,				
100	”	”	”	” mechanical dry
				pulp,
200	”	”	”	” chemical pulp,

the consumption of this timber is enormous, and is annually increasing.

Up to the present, practically nothing but Spruce has been used in Swedish pulp mills, but the day will probably arrive when other woods, of which Aspen has proved the most suitable so far, will be required to augment the supply of Spruce timber. So far as can be foreseen at present, the world is threatened with a pulp famine rather than a timber famine, unless cheaper substitutes are found for wood now used for that purpose. The forests of Sweden must become, consequently, of even more value and importance in the economy of Europe than they are at the present time, while it is certain that the rise in the value of timber, which has been going on in recent years, will continue for some time to come.

A. C. FORBES.

THE IDENTIFICATION OF COMMONLY CULTIVATED VARIETIES OF CEREALS.

I.—BARLEY.

** * This is the first of a series of three articles dealing with barley, oats, and wheat ; those on oats and wheat will appear in subsequent issues of the JOURNAL.*

The various experiments in cereal cultivation conducted by the Department in recent years have demonstrated in a convincing manner the advantages to be gained in yield and quality by the use of pure seed, i.e., seed which is the progeny of a single plant.

The extent of these advantages depends on several factors, chief among which is the hereditary productivity of the particular strain of which the selected parent plant is a member.

A consideration of even the rudiments of selection is beyond the scope of this article—the important bearing of the subject for the cultivator is that pure seed of any variety will yield him a larger return per acre than seed in which that variety forms only the greater portion of the whole, and moreover, the produce of pure seed will be evener in size of grain, ripening, and quality than that of mixed. While it is true that a farmer cannot become conversant with all the minute characters differentiating varieties, it is greatly to his advantage to be familiar with such differences as can be ascertained readily by a casual inspection of a field of growing corn or of a sample of seed. With this knowledge he is placed in a position to judge of the genuineness of purchased seeds, and he may further claim for himself the certainty of producing heavier yielding crops.

Others more closely interested in the growing and sale of seed require a detailed description of the grain and the points of differences of varieties. In this connection, it is advisable to point out that in the comparison of any two samples it is the sum of a whole series of points rather than any one point that should be used in discriminating between them. Further, while many of the characters used to distinguish varieties are botanical, some are purely quantitative and liable to large variations, according to the conditions under which the varieties in question were grown. Care should, therefore, be exercised to avoid too great a reliance on characters of this nature.

The most useful characters of varieties of barley to study for the purposes of identification are those—

- (1) Of the ear,
- (2) Of the straw, and, finally,
- (3) Habits of growth.

(1) Characters of the ear :—

(a) Shape.

(b) Grain : size, colour, and shape.

(c) Rachis and Rachilla.

(2) Straw :—

Length, length of "neck," colour.

(3) Habits of growth :—

Early or late.

(1) CHARACTERS OF THE EAR.

(a) *Shape*.—Varieties of barley in general cultivation in Ireland, viz., Archer, Chevallier, Goldthorpe, Standwell, and Spratt, are all two-rowed—by which term is meant that they have two rows of fully-developed grains. These are attached to the ear with their ventral or front surfaces facing the broadest part of the rachis, or that portion of the straw specially elaborated to carry the grain. In addition to the two rows of fertile there are four rows of infertile spikelets attached to each edge of the rachis at every node.

The first natural division of the five barleys is afforded by the shape of the ear, which is either *broad*, as in Goldthorpe, Standwell and Spratt, or *narrow*, as in Archer and Chevallier. With the width of ear is associated length of ear, which varies inversely as the breadth; thus very broad forms, such as Spratt, are much shorter than very narrow forms such as Chevallier. A further differentiating character is afforded by the awns; these in the broad-eared types under review diverge more or less according to the broadness of the ear and in the narrow-eared types are parallel.

(b) *Grain : size, shape, and colour*.—Size of grain is a quantitative character and as mentioned above it can only be used reliably when the varieties it is proposed to compare have been grown under similar conditions of soil, climate and cultivation. It is well known that thinly-sown corn produces coarser and larger grain than that grown under what are known as ordinary field conditions, and it would obviously be useless to attempt the differentiation of two samples grown under conditions capable of producing such strongly-contrasting results. Differences in size of grain are best shown by the weight of 1,000 corns of each of the varieties under comparison. The largest grained varieties are Goldthorpe, Standwell and Spratt; Archer is the smallest grained, and Chevallier occupies a position between it and the three broad-eared sorts.

The following Table shows the weight per 1,000 corns (on dry matter) of Archer, Goldthorpe, Standwell, and Chevallier, grown on the Department's experimental plots during the years indicated :—

THE IDENTIFICATION OF VARIETIES OF CEREALS—I. BARLEY.

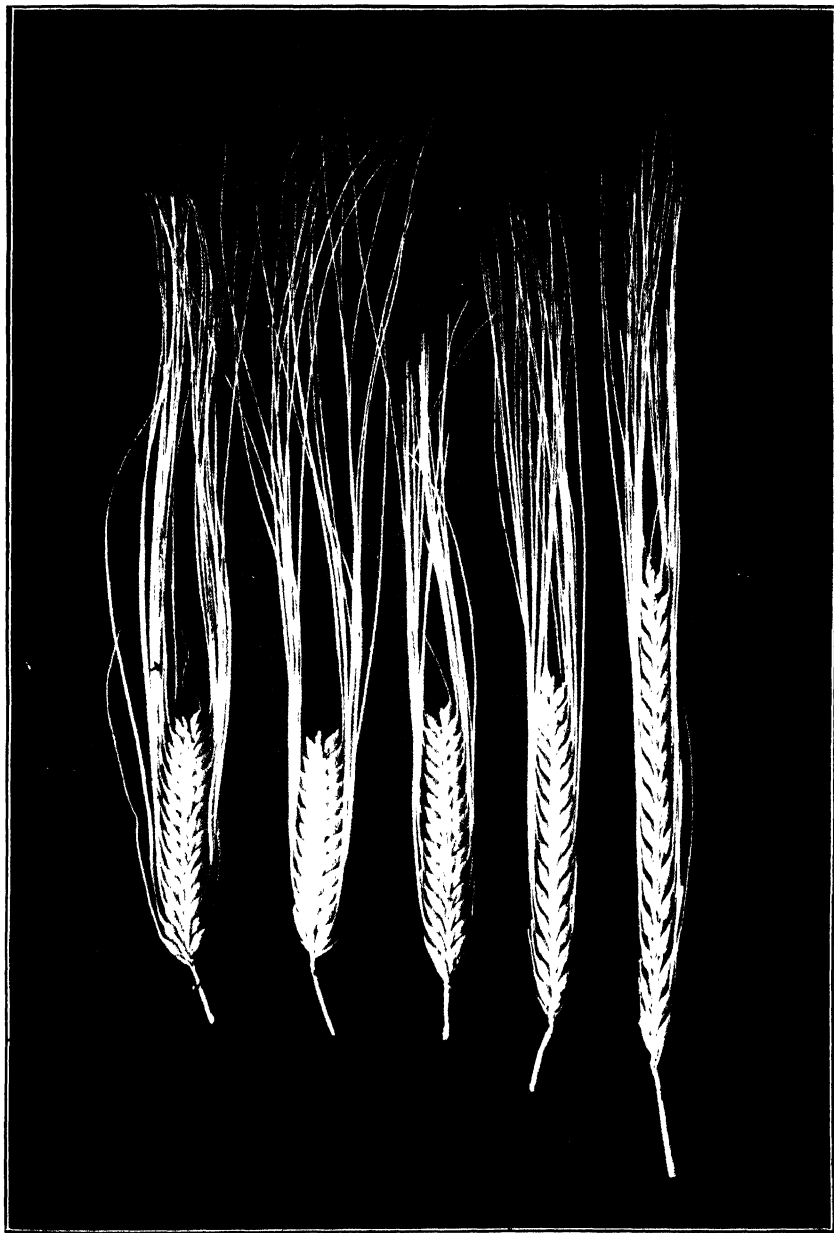


Fig. 1.—Showing (from left to right) ears of Spratt, Standwell, Goldthorpe, Archer and Chevallier.

THE IDENTIFICATION OF VARIETIES OF CEREALS.—I. BARLEY.

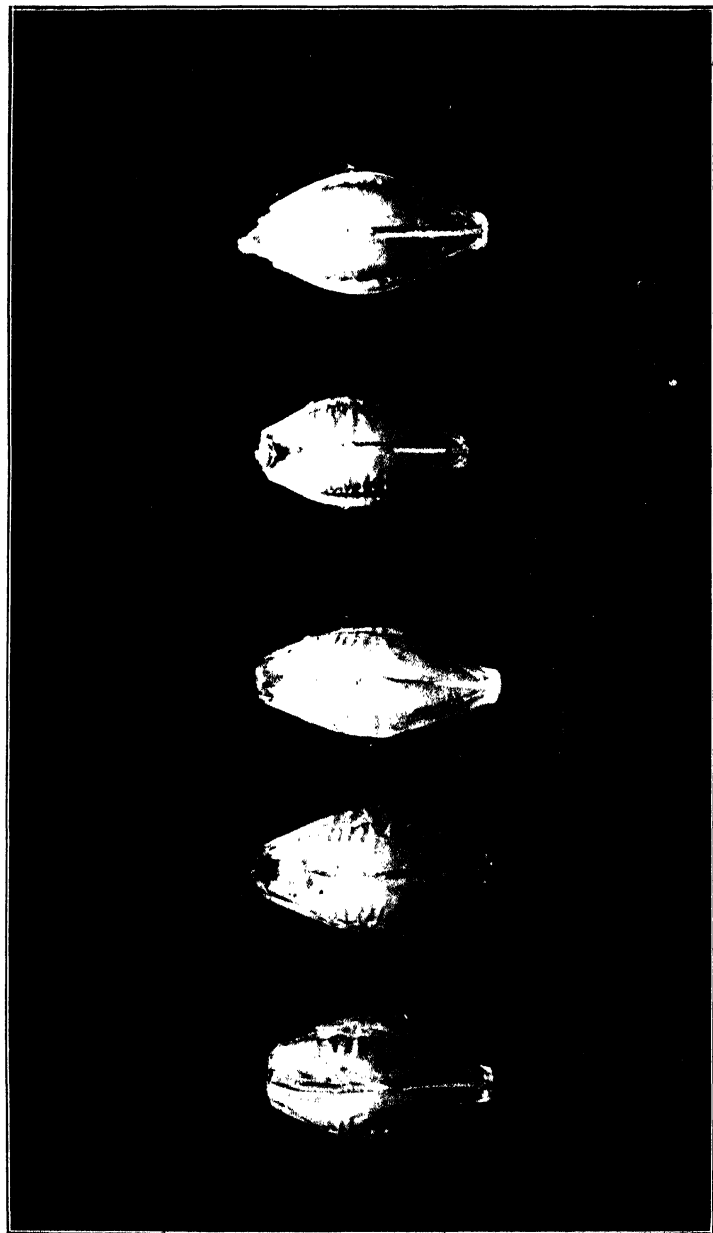


Fig. 2.—Showing view of ventral surface of grains. Left to right, Spratt, Standwell, Goldthorpe, Archer, and Chevallier with rachillae *in situ*.

THE IDENTIFICATION OF VARIETIES OF CEREALS. I. BARLEY.

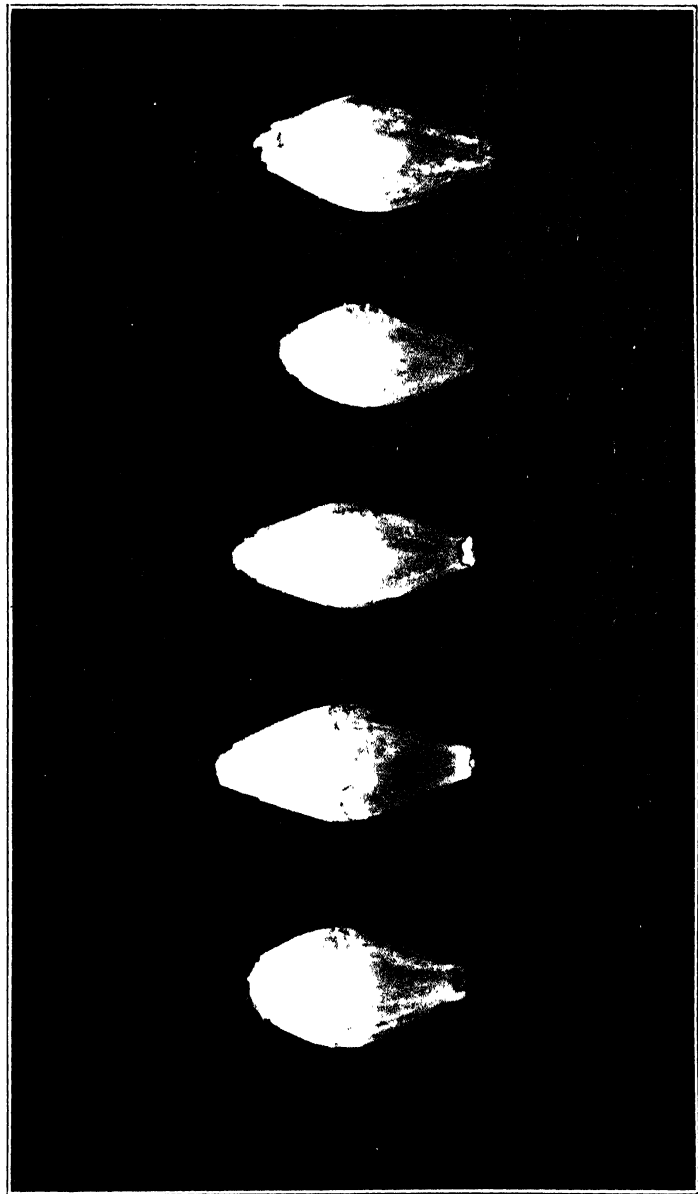


Fig. 3.—View of dorsal surface of grains. Left to right, Spratt, Standwell, Goldthorpe, Archer and Chevallier.

THE IDENTIFICATION OF VARIETIES OF CEREALS.—I. BARLEY.

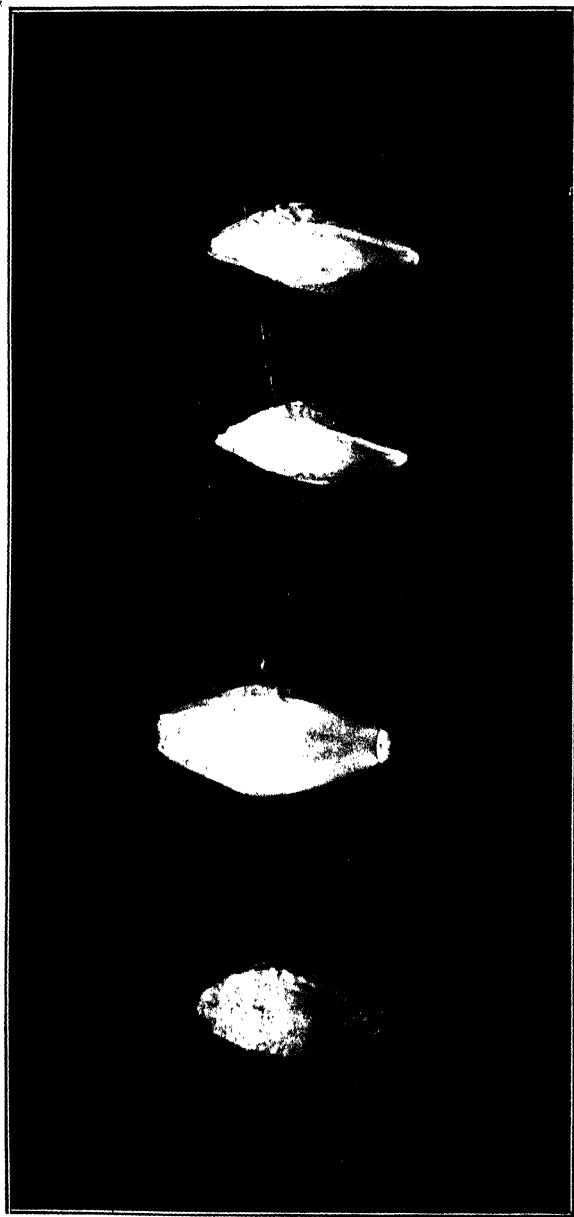


Fig. 4.—Showing (from the left) dorsal view of grains of Archer and Goldthorpe; and, following, side views of grains of the two varieties in the same order. (Notice the bevelled base of Archer and the transverse groove at the base of the Goldthorpe grain.)

THE IDENTIFICATION OF VARIETIES OF CEREALS.—I. BARLEY.

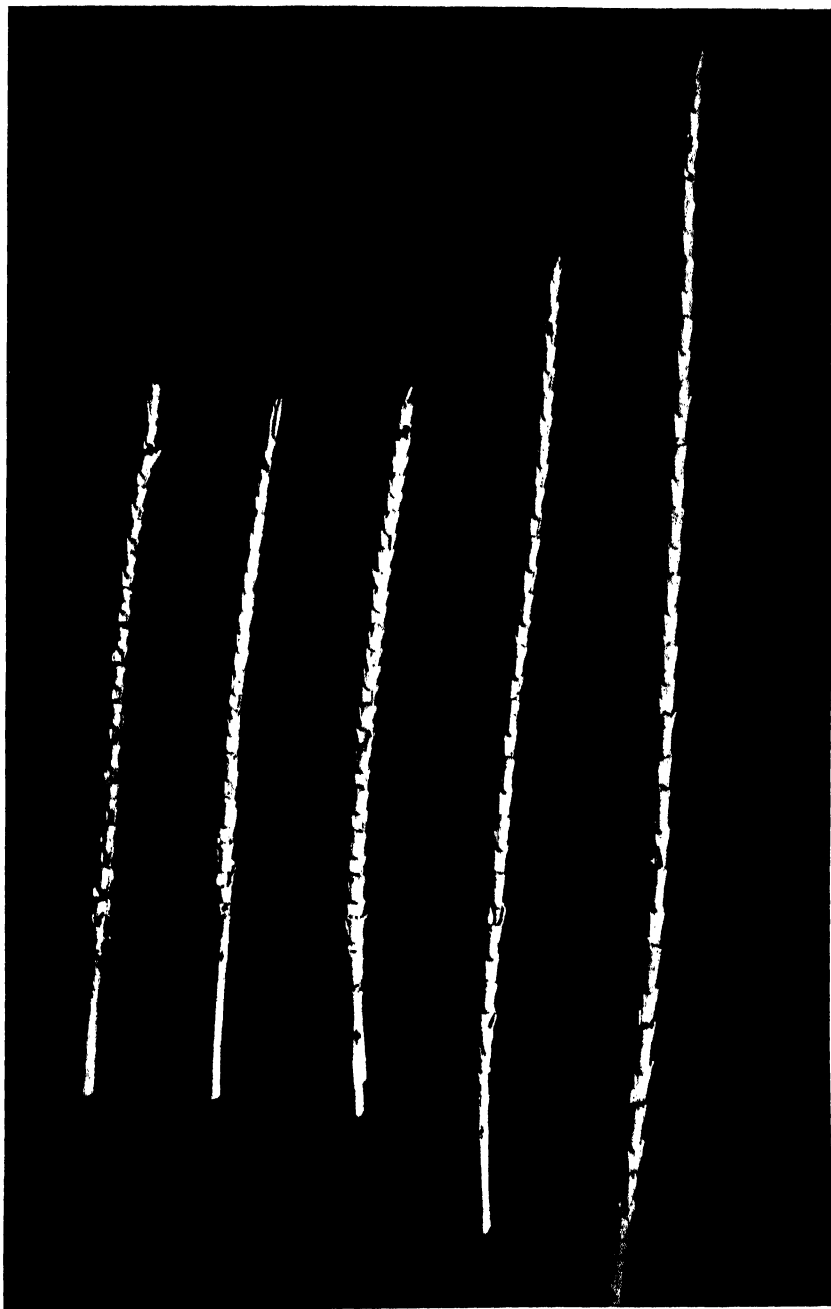


Fig. 5.—Showing rachis of varieties. Left to right, Spratt, Standwell, Goldthorpe, Archer, and Chevallier.

THE IDENTIFICATION OF VARIETIES OF CEREALS.
I. BARLEY.



Fig. 6.—Showing (from left to right) whole plants of Spratt, Standwell, Goldthorpe, Archer, and Chevallier. (Note the short “neck” of Archer and long “neck” of other varieties.)

Year.		Archer. Grammes	Goldthorpe. Grammes	Standwell. Grammes	Chevallier. Grammes
1901	. .	39.0	40.4	41.5	—
1902	. .	39.8	48.5	48.5	—
1903	. .	37.2	42.9	41.9	—
1904	. .	37.8	40.8	41.9	38.8
1905	. .	38.8	43.1	—	39.7
1906	. .	37.9	41.8	—	39.2
1908	. .	36.7	40.1	—	—
1909	. .	38.4	41.9	—	—

Shape of grain, is somewhat difficult to describe, and can probably be appreciated best from the accompanying illustrations.

Archer is short and flat, with a little more shoulder than *Goldthorpe*. It is a grey colour and the skin, in well-ripened samples, finely wrinkled. The base of the dorsal side of the grain is bevelled.

Chevallier is a much rounder and brighter-coloured grain than *Archer*, but it resembles that barley in that the base of the dorsal side of the grain is bevelled. The skin of *Chevallier* appears to adhere more closely to the grain than is the case in *Archer*.

Goldthorpe is long and tapers gradually to the awn. It is a rich yellow colour throughout its whole length. A very constant character is a deep, transverse groove or nick at the base of the dorsal side of the grain.

Standwell is shorter than *Goldthorpe* and tapers abruptly to the awn, which gives it the appearance of having broader "shoulders" than *Goldthorpe*. In colour it is yellowish-white; it does not possess the clearly defined transverse groove or nick at the base of the grain found in *Goldthorpe* nor is it bevelled as in *Archer* and *Chevallier*.

Spratt is a peculiarly short, roundish grain, slightly twisted, so that it is not bilaterally symmetrical. It is a dull grey colour. The grain of this barley has a characteristic hollow on its ventral surface and at about one-third of the distance from the top of the grain.

(c) *Rachis and Rachilla*.—If all the grains of an ear of barley are removed, the portion of the ear that is left is known as the rachis. The structure of the rachis of the varieties under discussion is very similar, but there are small differences between broad and narrow ears which may at times be of assistance in discriminating between them. For instance, the rachis of broad-eared barleys are generally broader, and the internodes, or distances between the places of grain attachment, shorter than in narrow-eared forms.

Attached to the base and lying in the furrow of the grain is a small rudimentary appendage known as the rachilla. It generally extends to about one-third the distance up the grain, and its constancy in character in different varieties is such as to render it of considerable value in their identification.

In the three barleys: Goldthorpe, Standwell, and Spratt, the rachilla is short and well covered with numerous fine, long hairs, which grow out from it for its whole length, while their extremities extend considerably beyond its apex.

In Archer the rachilla is longer and well covered with hairs, but here the points of the hairs do not extend beyond the apex of the rachilla.

The rachilla of Chevallier is probably the most easily recognised of the five barleys. It is longer than the other four and covered throughout its whole length with very short, fine hairs, so short, indeed, that the rachilla, unless closely examined, looks perfectly smooth.



Diagrammatic representation of rachillae (left to right) Spratt, Standwell, Goldthorpe, Archer and Chevallier.

The extent to which the rachilla is covered with hairs is reflected in the rachis, especially along its edges, and in the glumes, which, in Chevallier, are either covered with very short, fine hairs or hairless, and in Goldthorpe, with long hairs.

(2) STRAW.

The most striking difference in the straw of the five varieties is its length, and then in the erect or dropping habit acquired by the upper portion as the grain fills. Archer, while decidedly the shortest strawed variety is, in addition, perfectly erect. Goldthorpe, Standwell, and Chevallier are long-strawed and *drooping*, while Spratt is long and *erect*.

The portion of the straw from the point at which the blade and sheath of the uppermost leaf join, to the base of the ear is known as the "neck." In Goldthorpe, Standwell, Spratt and Chevallier the "neck" is long, while in Archer it is relatively very short.

The colour of the straw of each variety is similar to that of the grain. Thus, in Goldthorpe it is a bright yellow; Standwell, yellowish-white; Spratt, grey; Archer, grey; and Chevallier, a light yellow.

(3) HABITS OF GROWTH.

Characters to be noted under this heading are chiefly those of earliness and lateness in ripening. Archer is the latest variety, next in order being Chevallier, while the broad-eared varieties all ripen about the same time and earlier than Chevallier.

H. HUNTER.

SECOND IRISH EGG-LAYING COMPETITION.

1st OCTOBER—31st DECEMBER, 1913.

The second annual Laying Competition commenced on the 1st October, 1913. There are forty-one competing pens of the following breeds, viz. :—

White Wyandotte	.	.	.	11
Rhode Island Red	.	.	.	11
White Leghorn	.	.	.	5
Black Minorca	.	.	.	4
Buff Orpington	.	.	.	3
Brown Leghorn	.	.	.	3
White Orpington	.	.	.	2
Light Sussex	.	.	.	1
Red Sussex	.	.	.	1

In addition to these there are six pens entered as control pens, not competing, viz. :—

Rhode Island Reds	.	.	.	3
White Leghorn	.	.	.	2
Red Sussex	.	.	.	1

and it has been decided to test two pens of second year hens beside the 47 pens of pullets; these are all under exactly similar conditions, except that male birds are being used in both of the second year pens.

A notable fact is that there is no entry of Plymouth Rocks; this is, no doubt, due to the extremely poor results from the breed in the 1912-13 competition.

There is a distinct improvement in type in White Leghorns.

With the exception of one pen of pullets, the birds were in good condition on arrival, but again attention is directed to the fact that very immature pullets are not suitable for competition, as they do not begin to lay in time to catch the best prices.

Health has been, as a rule, good. One pullet died of tuberculosis three weeks after arrival, and so far no other death has occurred.

Health.

Broodiness. Broodiness has been much less frequent this year.

The weather was, on the whole, favourable. Slight frosts occurred in October and November, and heavy frost in December.

Weather.

General Conditions. The conditions of feeding and housing are similar to those followed in 1912-13. (See JOURNAL, Vol. XIII., No. 2, pages 303-6.)

The same method of grading eggs is used, viz.: Until 31st December every egg of 1 oz. 15 drs. is counted

Grading Eggs. a first grade egg, after which date the minimum for this grade is 2 oz.

Some of the pullets, especially Wyandottes, lay very small eggs, almost all the second grade eggs in the competition coming from pens of this breed.

A change has been made in the method of awarding prizes from that adopted in 1912-13.

This year the value of the eggs is the deciding factor, as the real test of a hen is the money value of her eggs, not the number.

The following Table gives the position of the different pens on 31st December, 1913 :—

[TABLE.]

Order of Merit.	No. of Pen.	Breed.	No. of eggs laid.	Value of Eggs.	Remarks.
				£ s. d.	
1	*45	Rhode Island Red .	240	1 14 11½	1 pullet moulted
2	*46	Red Sussex .	248	1 13 8½	1 " "
3	*50	Rhode Island Red .	219	1 12 3½	1 " "
4	30	White Wyandotte .	220	1 11 3½	
5	*43	White Leghorn .	200	1 10 7½	3 " "
6	*47	Rhode Island Red .	201	1 9 10	
7	25	Rhode Island Red .	201	1 9 9½	2 " "
8	*44	White Leghorn .	193	1 9 5½	1 " "
9	31	White Wyandotte .	192	1 6 10½	
10	2	Black Minorca .	169	1 6 2½	
11	7	White Leghorn .	171	1 5 2½	2 " "
12	11	Buff Orpington .	166	1 4 5½	
13	12	Buff Orpington .	157	1 2 10½	
14	*28	White Wyandotte .	156	1 2 9½	
15	5	White Leghorn .	153	1 2 9½	
16	27	White Wyandotte .	158	1 2 21½	2 " "
17	1	Black Minorca .	140	1 2 1½	
18	16	Light Sussex .	148	1 2 1	
19	3	Black Minorca .	134	1 1 0½	
20	35	White Wyandotte .	131	1 0 0½	
21	14	White Orpington .	127	0 19 7½	
22	{ 18	Rhode Island Red .	125	0 18 7½	
	4	Black Minorca .	118	0 18 7½	
24	41	Buff Orpington .	113	0 17 6½	
25	6	White Leghorn .	113	0 17 6½	
26	19	Rhode Island Red .	116	0 17 3½	2 " "
27	40	Brown Leghorn .	112	0 17 2½	
28	29	White Wyandotte .	110	0 17 1½	
29	38	Rhode Island Red .	105	0 15 10½	
30	15	Red Sussex .	95	0 14 11½	
31	23	Rhode Island Red .	98	6 14 5½	
32	26	White Wyandotte .	92	0 14 1	
33	32	White Wyandotte .	88	0 13 9½	
34	10	Brown Leghorn .	88	0 12 10	
35	21	Rhode Island Red .	78	0 12 4½	
36	33	White Wyandotte .	78	0 11 11½	
37	24	Rhode Island Red .	75	0 11 0½	
38	39	Rhode Island Red .	68	0 10 9	
39	17	Rhode Island Red .	65	0 10 4	
40	8	White Leghorn .	64	0 9 10½	
41	37	White Leghorn .	51	0 7 11½	
42	13	White Orpington .	48	0 7 6½	
43	22	Rhode Island Red .	52	0 7 5½	6 pullets moulted
44	9	Brown Leghorn .	45	0 7 1½	
45	42	White Wyandotte .	40	0 6 3½	
46	20	Rhode Island Red .	26	0 3 6	1 " "
47	36	White Wyandotte .	15	0 2 1½	1 " "

SECOND YEAR HENS.

1	*49	Rhode Island Red .	122	17 11	
2	*48	Rhode Island Red .	107	15 8	

' Not Competing.

L. MURPHY.

TOBACCO-GROWING IN IRELAND.

THE EXPERIMENTS IN 1913.

** * An article dealing with the experiments in Tobacco-growing in Ireland, conducted under the auspices of the Department up to the end of the year 1908, appeared in the issue of the Department's JOURNAL for January, 1909—Vol. IX., No. 2. Reprints of the article, with illustrations, have been issued in pamphlet form and may be obtained free of charge on application. Further articles, giving particulars of the progress of the experimental work in the years 1909, 1910, 1911, and 1912, appeared in the issues of the JOURNAL for January, 1910 (Vol. X., No. 2), January, 1911 (Vol. XI., No. 2), April, 1912 (Vol. XII., No. 3), and January, 1913 (Vol. XIII., No. 2) respectively. The paper below gives some account of the experiments, conducted in 1913, and shows the latest results obtainable.*

The series of tobacco experiments which have been conducted since 1904 under the direct supervision of the Department, were concluded in 1913 and, when complete returns for

**Method and
Scope of
Experiments.**

that year are available, a final report covering the entire experimental period of ten years, will be published. In 1913 the experiments were continued by nineteen persons, at eight centres, in six counties—King's, Limerick, Louth, Meath, Tipperary and Wexford. These persons were authorised to grow upon their own lands, for experimental purposes, 92 statute acres of tobacco. In addition to this area, 58½ acres were grown under the Small Growers' Scheme, which was started in 1910. This scheme encourages existing experimenters, who have the necessary experience and equipment for preparing tobacco for market, to assist neighbouring small holders in the production of tobacco by instructing and financing them, and by providing them with a cash market for their tobacco as soon as it is cured. These are the lines along which it is probable that further experiments will be conducted.

The acreage grown under this scheme was distributed as follows :—At Randlestown, co. Meath, thirty-nine farmers grew forty-eight and one-half acres ; at Athlumney, co. Meath, three farmers grew two and three-quarter acres ; at Smarmore, co. Louth, one farmer grew one acre ; and at Adare, co. Limerick, one farmer grew one acre. In addition to the experimental area proper, in respect of which grants are payable by the Department to those carrying on the work, three acres were grown by one experimenter, who took out an ordinary licence under the provisions of the Finance Act, 1908, permitting the general cultivation of tobacco in Ireland. Under these provisions, sixteen persons, not connected with the Department's experiments, also obtained from the Board of

Customs and Excise licenses to grow tobacco. The total area cropped by them was approximately thirteen acres.

Two experimenters also grew, under special licence, five acres of tobacco for the production of nicotine.

The weather was not unfavourable for seed beds, though rain at frequent intervals during this period seriously interfered with thorough preparation of the land for planting.

Weather. Most of the plants were transferred to the field under favourable conditions, but the prolonged drought which followed a wet, cold period, curtailed growth and retarded maturity. Any loss in this respect was, however, counterbalanced by an improvement in quality due to the dry weather. Harvesting was begun rather late in good weather. In the middle of September operations were accelerated owing to the occurrence of a period of frosty weather which, however, did no harm to the crop. The wet weather which prevailed at the end of harvest had the effect of preventing a killing frost until the 22nd of October.

Nine varieties were grown commercially for the production of pipe and cigarette tobaccos. Pipe tobacco was produced from

Varieties. Copper King, Burley, Kentucky Black, Yellow Mammoth, and strains of Blue Pryor selected in Ireland for their large leaves. Cigarette tobacco was produced from Irish Gold, Samos, Giourkioi, and Drama varieties. Cigar varieties were not grown commercially. In addition to the seven varieties which were grown on a commercial scale, tests were conducted on a small scale with twenty varieties and selections of seed. The results of experiments with varieties were as follows:—

For Roll and Plug.—All but seventeen acres of the area under experiments were devoted to this class of tobacco. Copper King proved decidedly the most suitable variety for the purpose. Other strains of Blue Pryor selected for large leaves were inferior in every respect except mere size, which is not an all important characteristic. Kentucky Black produced dark wrappers very suitable for spinning purposes.

Brown Wrappers for Roll and Plug.—Five acres of Broadleaf Burley were grown for this purpose, but the plants matured late, and were cured at low temperatures by means of braziers, with the result that the tobacco was deficient in body and rather bright in colour. It was, therefore, more suitable for cutting than for wrapper purposes. The production of Burley tobacco presents many disadvantages to Irish growers.

Cigarette Tobaccos were produced from Irish Gold and Turkish varieties on a total area of $9\frac{1}{2}$ acres. Irish Gold was affected somewhat by the season, and matured late, with the result that it was

cured bright with greater difficulty than usual. Its flavour, though mild, is not conventional, and manufacturers are not disposed to purchase it freely at a price which, from its handsome appearance, it would seem to merit. Turkish varieties were produced at only one centre, and all gave rather indifferent results as to quality and yield. The variety tests of the year 1913 confirm the conclusions of previous years that pipe tobacco of wrapper quality is decidedly the most suitable tobacco to produce in Ireland for the established home markets, and that the Irish bred variety, Copper King, is the best variety for the purpose.

The growing season was remarkably free from destructive winds. Kentucky hemp was used most extensively for shelter, but the high cost of imported seed, the difficulty of pro-

Shelter. tecting the germinating seedlings from pests and the slight value of hemp, except for shelter, all prompted a thorough test of Jerusalem artichokes as a shelter-plant for tobacco. The fear which most farmers have that artichokes may become a troublesome weed has rendered it difficult to induce growers to experiment with them as a wind-break, and it has yet to be determined whether these fears are justified by facts. As a shelter plant, however, artichokes gave very satisfactory results in 1913, notwithstanding the fact that they were planted late in badly-prepared soils. They grew quite eight feet in height, and when exposed to air and light, in double rows, the stalks were quite tough and resistant to wind. Artichokes are very easy to grow, and give a good yield of roots, having a food value about the same as potatoes, and the results of last year would appear to indicate that they should be grown for shelter in preference to hemp. Artichokes should be planted closely in single rows, which should be manured well and cultivated at the same time as the tobacco.

The soils which were affected most by drought in 1913 were those having heavy retentive subsoils. Owing to the wet Spring it was scarcely practicable to work these soils sufficiently fine to retain moisture during a dry period. Because of their superior texture, moory soils produced excellent growth.

Thorough preparation of the land was made very difficult by extremely wet weather, and the drought which followed seriously affected any land which was not carefully prepared. Land which was not reduced to a fine
Preparation of the Land and Manuring. tilth remained cloddy throughout the growing season, and narrow drills of coarse soil gave very poor yields. In dry seasons a large portion of the artificial manure, when applied in the drill near the surface,

remains undissolved, owing to the protection from rain afforded by the spreading leaves of the tobacco plants. For this reason the results of manurial tests, which were intended to show the effects of different kinds and quantities of artificial manure upon the flavour of tobacco, were not conclusive.

A trial was made of the Dutch method of covering seed beds with oiled paper strengthened on the under side by wide-meshed cotton fabric. This paper was attached to light,

Seed Beds. wooden frames of various designs, and used to cover both cold and hot beds. The results were

decidedly in favour of glass, as the paper is very fragile and perishable, and it obstructs the light to such an extent that growth of the seedlings is considerably retarded, and the development of moss and green scum is encouraged. When the thickness of the layer of top soil on the heating manure was less than four inches, the beds dried out very quickly, and later on the roots penetrated the manure thus inducing a soft, rapid growth, which could not be checked. On the other hand, top soils deeper than four inches retarded the development of seedlings about one week for every extra inch in depth of soil. The mixing of cornflour instead of sand or ashes with the seed, to aid in sowing it, had the effect of nearly destroying one bed owing to the mould which the cornflour induced. The use of a very coarse nozzle when watering a seed bed during the early stages disturbed the seeds at every watering, and destroyed them during germination. Sterilised soil was used extensively in making seed beds and gave such superior results that the practice should be adopted more generally. The simplest method of sterilising soil is to mix it, when fairly dry, with dry, fibrous vegetable matter into a heap and set it on fire in the same manner as cleanings from a field are burnt. Though all the soil used at one centre was thoroughly sterilised in an oven, a severe attack of root-rot occurred in some of the beds. The matter is discussed in this report under the head of Pests and Diseases.

Transplanting in the field was begun in the middle of May, and was not completed until the end of June. Small,

Planting. weak plants, and plants put out late, gave very inferior results, and the average yield per acre was appreciably curtailed on this account.

The first cultivation after planting was impeded by rains, but later cultivations were accomplished with ease,

Cultivation. and left most fields quite free from weeds. The wet season of 1912 left most tillage fields stocked with weed seeds, and the wet spring which followed greatly favoured their germination and growth. When these weeds were not

destroyed before the drought, they did harm by consuming the artificial manures at the start, and exhausting soil moisture later when it was badly needed.

The ripening season was favourable. Most of the tobacco was harvested in dry weather, the exception being some late tobacco.

In this climate it is difficult to wilt tobacco promptly. Placing the sticks of tobacco on scaffolds is effective but rather troublesome and expensive. Some growers are inclined to let the plants lie on the ground over-night and often longer, but this practice is unsafe. In 1913 a large portion of one grower's crop, while lying on the ground over-night, was seriously injured by a heavy rainfall which made it very dirty. A method of piling tobacco plants in the field in order to minimise the effects of rain, and at the same time render the plants compact and induce them to begin turning yellow, was tried with doubtful success. The objects aimed at were accomplished, but further experiments are necessary in order to learn to what extent the quality of the tobacco must necessarily be affected. If this practice could be adopted with safety, the saving in labour and barn space would be very considerable.

The pipe tobacco grown in 1913 had sufficient body and gum, and was, therefore, cured satisfactorily with comparative ease.

Practically all pipe tobacco was cured by means of open, wood fires, but at one centre, where there was a large number of small growers, the trouble and expense of supplying hard wood led to the extensive use of coke braziers, with good results. Disused carbide tins were the best and cheapest form of brazier, and this method of heating proved to be quite economical and efficient. A large proportion of the expense of curing is incurred in drying or "killing" the midribs of the leaves after the other parts are quite cured. A very successful experiment was made in 1913, whereby this item of expense, worry, and delay, was greatly reduced. When all parts of the leaf except the midrib are cured, it is easy to strip the leaves from the plant stalks and make a hollow pile or "kiln" of them. For this purpose a rectangular framework is formed of light wooden uprights, which stand on the floor four feet apart and are nailed temporarily, to the lower tierpoles of the curing barn. Nails are also driven into the uprights at intervals of about three inches, their heads being allowed to project outward for the purpose of supporting tobacco sticks in a horizontal position, thus forming a rectangular pen. Beginning at the bottom, as each stick is placed in position, a layer of leaves is laid thereon, with the large or butt ends of the midribs directed inward. The butts of the leaves project loosely towards the inside of the structure, while the more bulky part of the leaves, which are toward the outside, lie closer together and effectively prevent

the air from passing too freely through them. The walls of the "kiln" may be extended to any convenient height, and a roof then constructed in a manner somewhat similar. An opening in the wall is left as a door which may be closed by means of boards or thick canvas. Inside the "kiln" is placed a lighted coke brazier, which dries out the tobacco completely, including the midribs, in a very short time. The tobacco from one acre may be finished off in this manner with one good coke brazier in about one week, whereas it would ordinarily require four or five braziers for nearly one month to complete the curing by the usual methods. By the new method it is also quite easy and economical to keep the tobacco in safe condition, as regards moisture, until such time as it is convenient for it to be delivered to the rehandler, or otherwise dealt with.

The season was favourable for saving seed, and quite a large quantity of good seed was secured. In addition to the methods recommended in previous reports and leaflets,

Seed Saving. the plan of starting a few plants, exceptionally early, in a greenhouse and transplanting them to the open about the 1st of June, proved quite successful. Plants selected from early plots also ripened seed fairly well in 1913.

Owing to the continuous wet weather of 1912, and the difficulty of keeping the land free from weeds, slugs were very abundant in the early part of 1913, before dry weather set in.

Pests and Diseases. Several large fields had to be entirely replanted on this account. Very few fields suspected of being infested with wireworm were devoted to tobacco growing. In two fields corn was sown in order to ascertain whether it would prove a counter attraction to wireworm during the period when the plants were starting growth. Both fields had been under tobacco during the two previous seasons and had been severely attacked; and as wireworm is known to remain in the land for at least three years after it has been in grass, rye was sown in one field, in the Autumn of 1912, and ploughed under in the Spring. In the other field a few oat seeds were sown with the artificial manure at the "back of the scraw" when the drills were raised. Both methods seemed to furnish the means of avoiding injury to the tobacco by wireworm. The sowing of rye in the Autumn is, therefore, recommended for further trial in such cases.

A virulent attack of root-rot occurred at one centre, but it did not become apparent until immediately after the plants were transferred to the field. The planting was a total failure and the land was cleaned in July for a catch crop. A series of pot experiments was carried out in order to ascertain the origin of the attack of root-rot. The results proved quite clearly that the sterilised soil used in the beds was infected from the hot bed frames. These were old, decaying, wooden frames, which had been used on beds which had

yielded diseased plants in the previous season and had not been sterilised. The pot experiments showed that frames thus infected may be effectively sterilised with a strong solution of formalin applied before the beds are made up.

Two improved, air-curing barns, each capable of holding the tobacco from one acre, were erected in 1913, at
Curing Barns. a cost of £50 each. At the present price of materials this figure fairly represents the lowest cost of erecting single barns of this size and construction.

The tobacco grown in 1913 contained an unusually large percentage of first or wrapper grade of leaf, a result partly due to the absence of severe windstorms during the growing season. A large quantity of the tobacco
Grading,
Fermenting and grown in 1912 had a greenish colour after it was
Packing. cured, which rendered it necessary to sweat it in bulk before packing instead of maturing it in hogsheads. Sweating in bulk is much more effective than maturing in hogsheads owing to the damp condition of the tobacco which is permissible in the former case. Pipe tobacco for British markets should not be heavily fermented, for if it acquires the characteristic odour of cigar tobacco it is said to be "funked," and cannot be sold to manufacturers except at a sacrifice. The tobacco experimented upon was, therefore, given only two sweats instead of four which are recommended for cigar tobacco. When the operation was carefully conducted the green colour disappeared from the tobacco, and its flavour and burning quality were improved. The tobacco was packed with greater ease and economy than tobacco which was not bulked, thus counterbalancing to some extent the slight extra cost of the additional operations connected with bulking. The effect of bulking seemed also to increase the percentage of wrappers which the manufacturer was able to obtain from each lb. of unstemmed leaf. This might be explained by the fact that bulked tobacco being more tightly compressed, is not so likely to be broken while it is being packed.

That portion of the crop of 1912 which has been sold was purchased by three manufacturers in Dublin and
Marketing. one in Belfast. In every case the sale was made direct to the manufacturer.

The effect of the wet, cold season of 1912, which was terminated prematurely by a disastrous frost, not only greatly curtailed the yield, but lowered the quality to such an extent
Prices. that the prices obtained for the crop were below the averages of several previous years. Some account of the effects of frost upon yield and prices is given in the following Tables, which show the acreage, types, yields, costs, and selling prices, etc., of the 1912 crop and of previous years. The

returns for the 1913 crop are not yet available, but there is every indication that they will show a great improvement upon those of 1912.

TABLE I.

Showing the number of Experimenters and the Acreage, Yield and Prices of the Tobacco grown in each of the Years from 1904 to 1912 inclusive. (This Table refers to the Large Scale Experiments only, no account being taken therein of experiments conducted under the Department's Small Growers' Scheme, or experiments not carried out under the Department's supervision.)

Year.	No. of Growers	Total Acreage	Total Yield.	Yield per Acre.			Average selling Price per lb.	Range of Prices per lb.
				Average.	Maximum	Minimum.		
		Acrs.	lbs.	lbs.	lbs.	lbs.		
1904	1	20	7,984	400	—	—	5d.	4½d. to 6d.
1905	15	34	27,566	811	1,507	176	4½d.	2½d. to 9d.
1906	18	77½	60,714	861	1,661	277	4½d.	2½d. to 8½d.
1907	21	93	*55,194	*634	2,299	274	4½d.	3d. to 9d.
1908	21	101	121,191	1,200	1,971	868	5½d.	2d. to 2s. 6d.
1909	20	130½	118,798	910	1,307	644	†5½d.	1d. to 1s. 3d.
1910	19	118½	95,307	806	1,112	417	†5½d.	3d. to 1s. 6d.
1911	20	119½	134,486	1,125	1,496	799	†5½d.	3d. to 8d.
1912	20	107¾	71,843	665	1,035	243	†4½d.	2½d. to 7d.

* Produce of 6 acres at Kilkenny not included, as almost the entire crop grown on that area, estimated at 10,400 lbs., was accidentally destroyed by fire.

† The average in this column is calculated on the quantity sold, the amount unsold not being taken into account. 1,730 lbs. of the 1909 crop were sold at 5½d. per lb., and 432 lbs. of the 1910 crop were sold at 6½d. per lb. since the publication of the last report on these experiments. 20,861 lbs. of the 1909 crop, 17,442 lb. of the 1910 crop, 15,970 lb. of the 1911 crop, and 11,226 lb. of the 1912, crop are still unsold: the average price for each of those years is, therefore, subject to revision.

TABLE II.

Showing for each Class and Type of Tobacco grown commercially in the Year 1912 the Yield per acre, the Cost of Production per lb. and per acre, and the Amount received for the Tobacco per lb. and per acre.

Class :—		Pipe.	Cigarette.	Pipe and Cigarette.
Type :—		Prior.	Samos.	Mixed.
		Average of Five Centres.	One Centre.	One Centre.
Average yield per acre (lb.)		595	863	1,035
Cost of production, per lb.		10-9d.	11-2d.	6-6d.
Amount received, per lb.		3-9d.	4-9d.	5-3d.
		£ s. d.	£ s. d.	£ s. d.
Cost of production, per acre		27 1 0	40 5 8	28 7 5
Amount received, per acre		9 10 10	17 15 6	22 13 4

TABLE

Showing in detail the Expenses and Receipts per acre in
the Year

(NOTE.—The figures for Adare and Cordangan are not given below,
are accordingly

Class :—	Pipe.	
Type :—	Pryor.	
Centre :—	Athlumney, co. Meath.	† Duleek, co. Meath.
Seedbeds	£ s. d. 1 0 4	£ s. d. 1 15 6
Farmyard Manure for fields	—	2 0 0
Carting and Spreading Manure	—	1 4 2
Preparation of Land	0 18 6	3 6 10
Shelter Belts	—	\$ 0 0 5
Artificial Manure	5 4 0	5 11 7
Planting	0 15 0	0 17 0
Cultivation	1 0 6	1 13 7
Suckering and Topping	0 7 5	0 17 5
Harvesting	1 8 1	2 12 6
Curing	0 17 9	1 7 3
Fermenting	—	—
Grading	1 7 2	2 3 3
Packing	0 12 2	0 2 3
Maturing	0 2 5	—
Marketing	0 12 11	0 9 0
Rent, Taxes, and Insurance	2 15 7	2 6 4
Interest and Depreciation* (estimated)	3 10 0	3 10 0
Miscellaneous	—	—
1. Total Expenses	20 11 10	29 17 1
2. Receipts for Tobacco	7 0 4	12 1 10
3. Yield of Cured Tobacco (lb.)	421	645
4. Average Cost of Production, per lb.	10·2d.	11·1d.
5. Selling Price, per lb.	4·0d.	4·5d.
6. Area under experiment (acres)	10	1A. 3R. 24P.
7. Quantity of dry Tobacco damaged by frost, but included under head 3 (lb.)	—	—
8. Selling Price per lb. of frosted Tobacco	—	—
8(a). Selling Price per lb. of sound Tobacco	4·0d.	4·5d.
9. Estimated quantity of dry Tobacco destroyed by frost and abandoned, lb.	64	—

* This item relates to the curing equipment only, and is calculated on a 10 per cent. basis. The charge for implements is included with that for horse labour, which is taken at 3s. per day, exclusive of driver. Owing to the experimental nature of tobacco-growing in Ireland, elaborate and expensive curing barns have been provided at most centres, but the experiments having proved that the crops can be re-handled with less expensive equipment, it is considered more instructive to charge Interest and Depreciation upon the cheapest equipment which would be required by a person beginning the production of tobacco at the present stage. The total costs of production as set forth in the Table are likewise influenced by the experimental nature of the crop and by the inexperience of the growers.

† The tobacco produced at this centre was sold to a re-handler, who repacked and matured it, the charges for which were taken into consideration when the tobacco was being purchased.

III.

respect of various Types of Tobacco grown at certain centres in 1912.

as the respective crops have not yet been sold, and complete returns not available.)

			Cigarette.	Pipe and Cigarette.
			Samos.	Mixed.
Mullagh and Mullacrew, King's Co.	Smarmore, co. Louth.	** Tagoa co. Wexford.	Kilkenny.	Randlestown, co. Moath.
£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
1 14 4	1 11 10	1 4 2	2 15 8	1 17 6
3 15 0	2 14 4	2 18 4	1 13 7	\$ 0 2 0
0 11 8	2 3 5	0 14 2	0 6 11	\$ 0 0 11
1 3 9	2 2 8	1 17 0	0 18 11	1 6 1
\$ 0 0 9	—	\$ 0 1 2	0 14 8	—
5 17 6	2 14 0	3 5 0	—	4 11 2
0 10 5	0 13 5	0 14 0	2 4 8	1 0 2
1 9 8	0 17 1	1 7 0	1 14 2	1 15 10
0 11 5	0 13 7	0 11 10	1 3 4	1 0 5
1 6 7	1 18 5	2 19 5	6 11 3	2 15 8
1 19 11	1 18 1	3 15 2	7 10 10	2 11 8
—	\$ 0 2 0	—	—	0 3 0
1 10 11	2 2 9	2 19 2	0 11 6	1 16 0
0 18 8	0 15 7	1 17 8	2 10 6	1 9 9
1 1 2	0 7 8	0 14 2	1 14 4	0 8 11
0 4 11	0 6 6	0 11 3	†† 0 3 11	†† 0 3 1
1 4 3	2 11 3	1 6 3	3 11 5	1 5 3
3 10 0	3 10 0	3 10 0	6 0 0	6 0 0
—	—	0 18 6	—	—
27 10 10	27 2 7	31 4 3	40 5 8	28 7 5
12 15 10	6 12 4	11 15 8	17 15 6	22 13 4
620	588	707	863	1,035
10-7d.	11-1d.	10-6d.	11-2d.	6-6d.
5-0d.	2-7d.	4-0d.	4-9d.	5-3d.
14	18	13	7	|| 20
184	236	79	—	37
4-3d.	2-5d.	3-4d.	—	2-5d.
5-3d.	3-0d.	4-1d.	4-9d	5-4d.
185	259	23	—	—

†† The low charge for marketing is due to the fact that practically all of the charges except that for delivery at the nearest railway station, were borne by the purchaser.

|| Pipe tobacco was grown on 17½ acres, and cigarette tobacco on 2½ acres.

** In this case the tobacco was produced by 12 different growers in the neighbourhood of Tagoa. These growers have formed a co-operative society for the curing and disposal of the crops. In addition to the expenses incurred individually each grower is charged with a part of the general cost of curing and all subsequent operations proportionate to the weight of his crop. For details of the results in the case of each grower, see Table IV.

§ The Expenditure under this head was incurred in respect of only a portion of the area occupied by the experiment, but has been distributed over the entire area.

TABLE

Showing in detail the Receipts and Expenses in respect of Tobacco
Wexford, in the year 1912. The area cropped in

Class :—	Pipe.			
Type :—	Pryor.			
Name of Grower :—	Byrne, P.	Codd, N.	Doyle, E.	Doyle, M.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Seedbeds	1 6 9	1 2 0	1 14 4	0 17 9
Farmyard Manure for fields	3 6 0	4 0 0	4 19 0	2 10 0
Spreading Manure	0 16 3	0 12 0	0 19 0	0 9 7
Preparation of Land	4 8 5	3 6 10	1 4 5	1 4 5
Shelter Belts	—	0 1 1	0 3 0	—
Artificial Manures	3 14 6	3 7 0	4 3 3	3 18 6
Planting	0 14 0	0 11 11	0 11 10	0 13 9
Cultivation	0 16 10	2 3 4	0 15 10	0 12 2
Suckering and Topping	0 9 5	0 7 1	0 10 0	0 7 11
Harvesting	2 15 1	1 8 0	3 6 6	2 14 11
Curing	4 9 8	1 16 7	4 9 8	4 9 7
Fermenting	—	—	—	—
Grading	3 13 9	1 7 7	3 10 4	3 11 6
Packing	2 7 0	0 17 6	2 4 9	2 5 6
Maturing	0 17 8	0 6 7	0 16 10	0 17 2
Marketing	0 14 0	0 5 3	0 13 4	0 13 7
Rent, Taxes, and Insurance	1 8 6	1 10 6	1 8 0	1 7 10
Interest and Depreciation (estimated)	3 10 0	3 10 0	3 10 0	3 10 0
Miscellaneous Expenses	1 0 1	1 0 1	1 0 1	1 0 1
1. Total Expenses	36 7 11	27 13 4	36 0 2	31 4 3
2. Receipts for Tobacco	14 5 9	4 15 9	14 0 8	13 5 10
3. Yield of Marketable Tobacco (lb.)	881	329	840	854
4. Average cost of production, per lb.	9·9d.	20·2d.	10·3d.	8·8d.
5. Selling price, per lb.	4·0d.	3·5d.	4·0d.	3·7d.
6. Quantity of dry tobacco damaged by frost, but included under Head 3 (lb.)	—	—	—	299
7. Selling price per lb. of frosted tobacco	—	—	—	3·4d.
7(a). Selling price per lb. of sound tobacco	4·0d.	3·5d.	4·0d.	3·9d.
8. Estimated quantity of dry tobacco destroyed by frost and abandoned (lb.)	—	—	—	72

IV.

grown by the Wexford Tobacco Growers' Society at Tagoat, Co.
each case was, approximately, one statute acre.

Pipe.

Pryor.

Harpur, J.	Hayes, N.	Jacob, F. B.	Keating, Mrs. M.	Murphy, N.	Pettit, T.	Walker, W.	Walsh, W. J.
£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
1 2 8	2 2 0	1 2 0	1 0 8	1 5 2	1 0 7	1 6 2	1 13 9
2 0 0	4 0 0	3 16 0	3 10 0	4 12 6	3 0 0	—	2 5 0
0 10 0	1 1 5	1 9 6	0 16 4	1 6 3	0 12 10	—	0 11 0
1 11 6	2 13 5	2 2 0	2 1 2	2 0 10	1 5 0	1 0 6	1 2 0
—	—	0 3 11	0 1 3	0 3 2	—	—	0 2 6
3 9 0	2 15 8	3 11 6	3 7 0	3 7 0	2 12 11	4 8 10	3 10 0
0 16 1	1 9 5	1 5 11	0 14 10	0 11 9	0 14 10	0 13 6	0 4 2
0 14 1	1 19 5	2 19 3	2 0 0	1 9 2	0 14 3	1 16 6	1 10 4
0 12 6	0 7 1	0 9 2	0 12 6	0 17 6	0 3 4	1 10 3	1 6 8
3 10 0	2 17 2	3 4 4	5 4 2	3 10 9	1 5 10	4 17 6	3 18 6
4 0 10	2 12 3	2 7 1	5 10 4	3 12 5	2 18 3	5 14 8	6 15 11
—	—	—	—	—	—	—	—
3 2 8	2 3 11	1 16 10	4 6 4	2 18 7	2 6 10	4 0 2	5 11 1
1 19 10	1 7 11	1 3 5	2 15 0	1 17 2	1 9 10	2 11 1	3 10 9
0 15 0	0 10 6	0 8 10	1 0 8	0 14 0	0 11 2	0 19 3	1 6 7
0 11 11	0 8 4	0 7 0	0 16 5	0 11 1	0 8 11	0 15 3	1 1 1
1 10 0	1 8 0	1 7 6	1 6 0	1 6 0	1 8 6	1 10 6	1 10 0
3 10 0	3 10 0	3 10 0	3 10 0	3 10 0	3 10 0	3 10 0	3 10 0
1 0 1	1 0 1	1 0 1	1 0 1	1 0 1	1 0 1	1 0 1	1 0 1
30 16 2	32 6 7	32 4 4	39 12 9	34 13 5	25 3 2	35 14 3	40 9 5
12 17 7	7 18 6	6 11 7	18 2 3	10 15 2	9 5 2	16 3 11	22 18 4
747	524	440	1,031	698	659	968	1,327
9·9d.	14·8d.	17·6d.	9·2d.	11·9d.	10·8d.	8·9d.	7·3d.
4·1d.	3·6d.	3·6d.	4·2d.	3·7d.	4·0d.	4·1d.	4·1d.
80	10	268	—	366	—	—	—
3·4d.	3·4d.	3·4d.	—	3·4d.	—	—	—
4·2d.	3·6d.	3·9d.	4·2d.	4·0d.	4·0d.	4·1d.	4·1d.
18	—	82	—	122	—	—	—

TABLE V.

Showing per Statute Acre, for the Years 1909, 1910, 1911, and 1912 respectively, the Yield of Tobacco (with Selling Price per lb.), the Cost of Production, the Amount received for the Crop, and the Loss to the Grower, apart from the Experimental Grant of £50 per acre, at centres where Pipe Tobacco was grown.

Centre.	Year.	Area under Pipe Tobacco.	Yield.	Average selling price per lb.	Cost of Production.	Amount received for Tobacco.	Loss on Tobacco.
		Acres	lbs.		£ s. d.	£ s. d.	£ s. d.
Smarmore	1909	21½	726	5·0d.	36 15 11	14 17 11	21 18 0
	1910	18	417	4·9d.	27 18 7	8 11 0	19 7 7
	1911	18	949	5·0d.	28 1 3	19 15 9	8 5 6
	1912	18	588	2·7d.	27 2 7	6 12 4	20 10 3
Athlumney,	1909	9½	878	5·6d.	24 4 10	20 9 7	3 15 3
	1910	10	953	5·2d.	24 15 6	20 15 1	4 0 5
	1911	10	1,138	5·4d.	23 3 9	25 15 2	2 11 5
	1912	10	421	4·0d.	21 11 10	7 0 4	14 11 6
*Tagoat, co. Wexford,	1909	13½	850	5·0d.	28 1 7	17 14 9	10 6 10
	1910	12½	833	4·7d.	32 7 3	16 13 8	15 13 7
	1911	13½	1,111	4·8d.	38 13 8	22 7 6	16 6 2
	1912	13	707	4·0d.	31 4 3	11 15 8	19 8 7
Mullagh and Mullacrew	1909	14	880	5·3d.	23 4 8	19 9 6	3 15 2
	1910	14	800	5·0d.	23 14 0	16 13 1	7 0 11
	1911	14	1,114	5·8d.	27 13 9	26 13 10	0 19 11
	1912	14	620	5·0d.	27 10 10	12 15 10	14 15 0
†Randlestown,	1910	18½	1,063	5·5d.	25 0 0	24 4 0	0 16 0
	1911	20	1,605	5·2d.	27 0 8	31 17 0	4 16 4
	1912	17½	1,033	5·0d.	25 1 8	21 13 1	3 8 7
†Cordangan,	1910	5	599	4·5d.	38 9 0	11 3 9	27 5 3
	1911	5	1,240	4·5d.	46 15 3	22 19 10	23 15 5
	**1912	10	243	—	—	—	—

* In the case of Tagoat the tobacco was produced by 12 different growers. See Note ** to Table III.

† More than one class of tobacco was grown at Randlestown in 1910, 1911 and 1912 and at Cordangan in 1910 and 1911, and as separate expense accounts were not accurately kept for the several classes, the figures representing the cost of production in these cases are estimates which were carefully made by the respective experimenters at the time the work was performed.

** This crop has not yet been sold. Complete figures for inclusion in this Table are accordingly not available.

TABLE VI.

Showing (1) the Average Price per lb. ; and (2) the Relative Quantities expressed as percentages of the total crop, of each of the grades of pipe tobacco grown at Randlestown, Smarmore Athlumney, and Tagoat, during the Years 1909, 1910, 1911 and 1912 respectively, and at Cordangan in the years 1910 and 1911 respectively.

Centre.	Year.	Area under Pipe Tobacco.	Average yield of Cured Pipe Tobacco per Acre.	Average Price per lb.			Relative quantities of the different grades produced, expressed as percentages of the total crop.		
				1st Grade	2nd Grade	3rd Grade	1st Grade	2nd Grade	3rd Grade
		Acrea.	(lbs.)	d.	d.	d.			
Randlestown, co. Meath,	1909	10½	852	7·2	5·6	4·5	38	39	23
	1910	18½	1,065	6·5	5·5	4·5	25	46	29
	1911	25½	1,486	7·3	5·1	4·5	21	40	39
	†1912	17½	992	6·6	5·0	4·5	19	48	33
Smarmore, co. Louth	1909	21½	743	6·5	5·5	4·5	5	30	65
	1910	18	417	5·8	5·0	4·3	12	60	28
	1911	18	949	6·3	5·5	3·4	25	43	32
	†1912	18	352	—	3·0	2·5	—	57	43
Athlumney, co. Meath,	1909	9½	885	6·5	5·5	4·5	43	26	31
	1910	10	953	5·8	5·0	4·5	43	36	21
	1911	10	1,138	6·5	5·5	4·5	30	40	30
	†1912	10	421	6·6	5·1	3·0	5	14	81
*Tagoat, co. Wexford,	1909	13½	850	6·0	5·0	4·6	28	45	27
	1910	13½	831	5·4	4·8	4·3	18	47	35
	1911	13½	1,111	6·5	4·6	3·9	22	51	27
	†1912	13	624	5·1	4·0	3·4	26	44	30
Cordangan, co. Tipperary	1909†	—	—	—	—	—	—	—	—
	1910	4½	572	5·5	4·8	4·0	26	40	34
	1911	5	1,240	7·0	5·5	3·8	3	35	62
	†1912§	10	243	—	—	—	—	—	—

* In the case of Tagoat the tobacco was produced by twelve different growers. See Note ** Table III.

† Cigar Tobacco only was grown in 1909 at this centre.

‡ The figures for 1912 do not include frosted tobacco account of which is given in Table III.

§ This crop has not yet been sold. Complete figures for inclusion in above Table are accordingly not available.

NOTE.—Pipe tobacco exclusively was grown at Mullagh-Mullacrew centre during 1909, 1910, 1911, and 1912, but owing to the fact that the tobacco was sold each year at a round or average price per lb. without reference to the relative value of the different grades, no figures for inclusion in the above Table are available for this centre.

Summary of Results of Small Growers'

Rehandler.	Grower.	(1)	(2)	(3)	(4)
		Cost of production per acre to Grower exclusive of his labour.	Rehandler's expenses per acre exclusive of any charge for Interest & Depreciation.	Total cost of production per acre omitting items excluded under Nos. 1 & 2.	Total Receipts per acre for finished Tobacco.
		£ s. d.	£ s. d.	£ s. d.	£ s. d.
Col. Sir N. T. Everard, Bart., H.M.L., Randles- town, Navan, co. Meath.	Brabazon, Thos. . . .	11 19 3	1 16 11	13 16 2	7 8 5
	Brady, Jno. . . .	15 18 0	2 14 3	18 12 3	12 15 10
	Brennan, Thos. . . .	11 0 11	2 3 9	13 4 8	8 17 9
	Brownell, Jervis . . .	9 1 4	0 17 7	9 18 11	5 17 10
	Caffery, Jas (Stackallen) . .	12 16 8	3 3 6	16 0 2	16 4 4
	Caffrey, Mary A. . . .	18 4 4	1 16 7	20 0 11	9 9 7
	Caffrey, Jas. (Wilkinstown) .	11 18 8	1 12 4	13 11 0	6 7 0
	Callaghan, Pk. . . .	11 16 5	3 9 4	15 5 9	20 9 3
	Callan, Jas. . . .	10 5 3	1 1 3	11 6 6	5 8 5
	Collins, Jos. . . .	10 1 9	1 1 1	11 2 10	4 13 6
	Connell, Hugh	12 9 1	2 15 11	15 5 0	15 3 1
	Crinion, R. . . .	12 10 5	3 3 3	15 13 8	13 19 8
	Davis, J. . . .	15 14 0	1 18 6	17 12 6	11 8 0
	Dogherty, Pk. . . .	12 17 1	2 10 3	15 7 4	11 10 5
	Dogherty, T. . . .	12 6 2	1 17 11	14 4 1	9 0 5
	Donagan, T. . . .	18 11 4	2 16 2	21 7 6	11 19 8
	Duffy, T. . . .	12 6 0	1 18 6	14 4 6	7 5 4
	Fagan, Jno. . . .	13 9 0	2 16 11	16 5 11	13 15 6
	Flood, P. . . .	11 18 7	2 17 6	14 16 1	10 17 4
	Giblin, T. . . .	12 7 0	3 2 0	15 9 0	11 17 0
	Halpin, Mary A. . . .	12 9 6	3 3 0	15 12 6	13 19 4
	Harte, P. . . .	10 5 8	0 17 4	11 3 0	3 15 6
	Heany, O. . . .	11 3 9	2 13 4	13 17 1	13 9 6
	Hughes, J. . . .	12 7 6	1 8 0	13 15 6	6 18 0
	Kearney, P. . . .	13 18 0	2 13 9	16 11 9	11 18 2
	Law, J. A. . . .	14 2 5	4 0 0	18 2 5	22 1 5
	M'Glew, Kate	8 8 0	0 12 3	9 0 3	2 10 2
	M'Hugh, M. . . .	11 15 10	3 4 4	15 0 2	17 17 10
	M'Hugh, P. . . .	9 13 7	2 12 2	12 5 9	12 9 6
	M'Hugh, T. . . .	12 7 8 0	3 0 8	15 8 8	23 17 6
	M'Ivor, T. . . .	10 18 0	0 16 3	11 14 3	2 15 4
	M'Kenna, H. . . .	12 5 6	2 18 1	15 3 7	14 8 9

* Destroyed accidentally by fire in curing barn.

“Rehandling”) Experiment in the Year 1912.

(5)	(6)	(7)	(8)	(9)	(10)	(10a)	(11)
Amount available for covering cost of Grower's labour, and Rehandling charges for Interest and Depreciation.	Yield per acre.	Average Price per lb. received by Re-handler for finished Tobacco.	Area under experiment.	Quantity of Tobacco damaged by frost, but included under Head 6.	Price per lb. received by Re-handler for frosted Tobacco.	Price per lb. received by Re-handler for sound Tobacco.	Estimated quantity per acre of dry Tobacco destroyed by frost and abandoned.
£ s. d.	lb.	d.	A. R. P.	lb.	d.	d.	lb.
6 7 9 (deficit)	418	4.3	0 2 3	40	2.0	4.5	525
5 16 5 „	735	4.2	1 0 0	95	2.0	4.5	65
4 6 11 „	474	4.5	1 0 0	—	—	4.5	184
4 1 1 „	576	2.5	0 2 18	441	2.0	4.0	77
0 4 2	865	4.5	1 0 0	—	—	4.5	—
10 11 4 (deficit)	610	3.7	1 0 0	188	2.0	4.5	93
7 4 0 „	442	3.4	1 0 6	187	2.0	4.5	125
5 3 6	1,026	4.8	0 3 37	—	—	4.8	—
5 18 1 (deficit)	630	2.1	2 0 34	614	2.0	4.5	138
6 9 4 „	561	2.0	1 0 22	561	2.0	—	143
0 1 11 „	808	4.5	0 3 36	—	—	4.5	314
1 14 0 „	746	4.5	1 0 0	—	—	4.5	249
6 4 6 „	608	4.5	0 2 0	—	—	4.5	*600
3 16 11 „	614	4.5	0 3 36	—	—	4.5	—
5 3 8 „	481	4.5	0 3 39	—	—	4.5	427
9 7 10 „	706	4.1	0 2 0	120	2.0	4.5	360
6 19 2 „	557	3.1	0 3 38	250	2.0	4.5	394
2 10 5 „	767	4.4	1 0 8	57	2.0	4.5	342
3 18 9 „	796	3.3	1 0 0	119	2.0	3.5	214
3 12 0 „	844	3.4	0 2 0	382	2.0	4.5	80
1 13 2 „	790	4.5	0 2 0	—	—	4.5	198
7 7 6 „	201	4.5	0 3 39	—	—	4.5	390
0 7 7 „	813	4.0	1 3 38	169	2.0	4.5	—
6 17 6 „	828	2.0	0 2 0	828	2.0	—	172
4 13 7 „	950	3.0	0 3 37	567	2.0	4.5	249
3 19 0	1,177	4.5	1 0 5	—	—	4.5	—
6 10 1 (deficit)	150	4.0	1 0 8	—	—	4.0	150
2 17 8	1,105	3.9	0 3 37	271	2.0	4.5	53
0 3 9	665	4.5	0 3 38	—	—	4.5	222
8 8 10	1,185	4.8	0 3 38	—	—	4.8	—
8 18 11 (deficit)	332	2.0	1 1 22	332	2.0	—	244
0 14 10 „	1,039	3.3	0 3 38	484	2.0	4.5	117

TABLE

		(1)	(2)	(3)	(4)
Rehandler	Grower.	Cost of production per acre to Grower exclusive of his labour.	Re-handler's expenses per acre exclusive of any charge for Interest & Depreciation.	Total cost of production per acre omitting items excluded under Nos. 1 & 2.	Total Receipts per acre for finished Tobacco.
		£ s. d.	£ s. d.	£ s. d.	£ s. d.
Col. Sir N. T. Everard, Bart., H.M.L., Randles- town, Navan, co. Meath	Mitchel, Jno. . . .	11 7 5	4 12 5	15 19 10	23 3 5
	Mongey, T. . . .	12 8 0	2 8 7	14 16 7	11 10 2
	Mullen, Jane . . .	11 2 10	2 13 3	13 16 1	12 0 0
	Newman, J. . . .	12 7 11	3 4 7	15 12 6	9 8 1
	Powderly, L. . . .	18 2 6	2 11 6	20 14 0	13 6 3
	Price, P. . . .	10 19 7	1 18 10	12 18 5	7 18 9
	Reid, M. . . .	10 18 1	1 18 0	12 16 1	9 2 6
	Reilly, P. . . .	7 7 11	1 19 10	9 7 9	14 16 5
	Roarke, J. . . .	10 17 1	2 18 0	13 15 1	16 5 7
	Togher, Jno. . . .	9 11 1	1 19 5	11 10 6	8 10 0
	Traynor, T. . . .	12 8 11	3 12 4	16 1 3	18 7 3
	White, P. . . .	6 9 6	2 15 3	9 4 9	8 18 7
	Wogan, P. . . .	7 2 8	1 5 9	8 8 5	6 9 8
R. C. Metge, Esq., Johns- town, Navan, co. Meath	Kennedy, Thos. . . .	10 7 8	3 18 0	14 5 8	13 14 6
	Loughran, Fras. . . .	13 10 3	3 18 0	17 8 3	16 17 6
	Lynch, Thos. . . .	(Final figures not available).			
	Navagh, Jos. . . .	11 16 10	4 3 0	15 19 10	17 15 7
Geo. Taaffe, Esq., D.L., Smarmore, Ardee, co. Louth	Norton, H. R. . . .	9 15 10	3 18 0	13 13 10	9 7 3
	French, Ml. . . .	12 7 6	2 16 3	15 3 9	5 6 8

VII.—*continued.*

(5)	(6)	(7)	(8)	(9)	(10)	(10a)	(11)
Amount available for covering cost of Grower's labour, and Rehandling charges for Interest and Depreciation.	Yield per acre.	Average Price per lb. received by Re-handler for finished Tobacco.	Area under experiment.	Quantity of Tobacco damaged by frost, but included under Head 6.	Price per lb. received by Re-handler for frosted Tobacco.	Price per lb. received by Re-handler for sound Tobacco.	Estimated quantity per acre of dry Tobacco destroyed by frost and abandoned.
£ s. d.	lb.	d.	A. R. P.	lb.	d.	d.	lb.
7 3 7	1,236	4·5	0 2 7	—	—	4·5	—
3 6 5 (deficit)	614	4·5	0 3 38	—	—	4·5	302
1 16 1 „	640	4·5	1 0 16	—	—	4·5	122
6 4 5 „	791	2·9	0 2 23	340	2·0	3·5	—
7 7 9 „	710	4·5	0 2 0	—	—	4·5	262
4 19 8 „	796	2·4	1 0 17	670	2·0	1·5	149
3 13 7 „	590	3·7	2 0 20	185	2·0	4·5	153
5 8 8	899	4·0	2 1 30	195	2·0	4·5	86
2 10 6	957	4·1	2 0 5	160	2·0	4·5	151
3 0 6 (deficit)	674	3·0	2 0 19	420	2·0	4·5	—
2 6 0	1,017	4·3	0 2 10	68	2·0	4·5	87
0 6 2 (deficit)	536	4·0	0 2 12	—	—	4·0	247
1 18 9 „	512	3·0	1 3 36	299	2·0	4·5	291
0 11 2 „	941	3·5	1 0 0	—	—	3·5	—
0 10 9 „	1,013	4·0	1 0 0	—	—	4·0	—
			1 0 0				
1 15 9	1,138	4·8	1 0 0	—	—	4·8	—
4 6 7 (deficit)	642	3·5	0 2 0	—	—	3·5	—
9 17 1 „	512	2·5	1 0 0	512	2·5	—	—

TESTS WITH FOUR NITROGENOUS MANURES.

Until comparatively recently the main supply of nitrogen from artificial sources for farm crops has been derived from nitrate of soda and sulphate of ammonia. During the last few years, however, two other nitrogenous manures, viz., calcium cyanamide and nitrate of lime, have been placed on the market.

With a view to comparing the relative manurial value of these four manures for different farm crops, a series of experiments has been carried out by the Department each season since 1909. The general plan of the experiments has been the same throughout, so that the figures set forth in the Tables of results are strictly comparable.

The manures were applied in the ordinary way at time of sowing the seed, except in the case of nitrate of soda and nitrate of lime : these were applied as a top dressing when the plants were well above ground.

In every case the cultivation of the plots was the same, and the only varying factor in the manurial dressings was the source of nitrogen. Approximately an equal quantity of nitrogen was applied to each plot, the nitrogen contained in 1 cwt. sulphate of ammonia being taken as the standard.

To ensure the greatest possible accuracy in the tests, calcium cyanamide and nitrate of lime of uniform quality were supplied to the experimenters by the Department. Each season, these two manures were analysed before being forwarded to the experimental centres. The variations in the nitrogen content of the manures, from year to year, were as follows :—

	Minimum.	Maximum.
Calcium Cyanamide, ..	18 per cent.	20 per cent.
Nitrate of Lime, ..	12 „	13 „

Commencing in 1911, an extra plot was included in the experiments. This plot, in the case of each crop, was dressed with a specially prepared calcium cyanamide compound identical with the Department's standard formula for that crop, except that calcium cyanamide was used instead of sulphate of ammonia as the source of nitrogen.

The only difference in the treatment of the two plots dressed with calcium cyanamide was, that this manure was applied in the ordinary way on the one plot, whilst the three manures were compounded together some time before application in the case of the extra plot.

The average results of the experiments for each season and for the entire period, are summarised in the following Tables.

OATS.

TABLE I.—Showing the average results of 30 experiments carried out during the five seasons, 1909-13.

Year.	No. of Experiments.	Nitrogenous Manure Applied.											
		No Nitro- genous Manure.		Nitrate of Soda.		Nitrate of Lime.		Sulphate of Ammonia.		Calcium Cyana- mide.		Calcium Cyanamide Mixture.	
		Average Yield per Statute Acre.											
		Grain.	Straw.	Grain.	Straw.	Grain.	Straw.	Grain.	Straw.	Grain.	Straw.	Grain.	Straw.
		cwt. qr.	cwt.	cwt. qr.	cwt.	cwt. qr.	cwt.	cwt. qr.	cwt.	cwt. qr.	cwt.	cwt. qr.	cwt.
1909,	5	24 1	41	25 2	50	27 0	44	26 2	47	27 0	44	—	—
1910,	7	15 2	34	19 2	42	19 3	41	20 2	43	19 2	39	—	—
1911,	8	15 2	25	18 3	30	18 2	30	18 2	30	17 3	28	17 1	28
1912,	5	18 2	42	22 1	53	21 2	51	23 0	51	21 3	48	21 1	48
1913,	5	12 3	27	18 2	37	16 2	34	16 2	32	15 2	31	15 0	30
Average Yield, 1909-13 (30 Experiments)		17 0	33	20 2	41	20 1	40	20 3	40	20 0	37	*17 3	34

* Average of 18 experiments only, 1911-13.

All the plots at each centre were dressed with 3 cwt. super-phosphate and 3 cwt. kainit per statute acre in addition to the nitrogenous manure.

It is worthy of note that each season, the lowest average yield of straw has been obtained from the plots manured with calcium cyanamide.

POTATOES.

TABLE II.—Showing the average results of 60 experiments carried out during the five years, 1909-13.

Year.	No. of Experiments.	Nitrogenous Manure Applied.						
		No Nitro- genous Manure.	Nitrate of Soda.	Nitrate of Lime.	Sul- phate of Am- monia.	Calcium Cyana- mide.	Calcium Cyana- mide Mixture.	
		Average Yield per Statute Acre.						
		T. C.	T. C.	T. C.	T. C.	T. C.	T. C.	
1909,	10	11 10	12 2	12 10	12 6	12 15	—	
1910,	10	10 3	11 7	11 6	11 15	11 13	—	
1911,	14	10 4	11 6	10 17	11 18	11 7	11 0	
1912,	12	11 5	12 3	12 9	13 8	11 13	11 1	
1913,	14	11 3	12 2	12 7	12 10	12 4	12 6	
Average Yield, 1909-13 (60 experiments)		10 17	11 16	11 17	12 7	11 18	*11 9	

* Average of 40 experiments only, 1911-13.

In addition to the nitrogenous manure, each plot received a moderate dressing of farmyard manure, also superphosphate and muriate of potash at the rate of 4 cwts. and 1 cwt. respectively, per statute acre.

Since the proportion of small potatoes was practically identical in the case of each plot, total yields only are given in the foregoing table of results.

TURNIPS.

TABLE III.—Showing the average results of 46 experiments carried out during the five seasons, 1909-13.

Year.	No. of Experiments.	Nitrogenous Manure Applied.					
		No Nitrogenous Manure.	Nitrate of Soda.	Nitrate of Lime.	Sulphate of Ammonia.	Calcium Cyanamide.	Calcium Cyanamide Mixture
		Average Total Yield per Statute Acre.					
		T. C.	T. C.	T. C.	T. C.	T. C.	T. C.
1909,	4	23 11	26 6	24 17	25 3	26 3	—
1910,	10	25 11	26 10	25 15	25 13	25 16	—
1911,	15	24 4	25 11	25 5	25 2	25 4	24 14
1912,	9	24 0	26 16	26 17	27 8	25 17	25 19
1913,	8	14 13	17 12	17 3	17 11	17 11	16 19
Average Yield, 1909-13 (46 experiments)		22 15	24 14	24 4	24 7	24 4	*23 2

* Average of 32 experiments only, 1911-13.

During the first four seasons, a moderate dressing of farmyard manure, 4 cwts. superphosphate and 3 cwts. kainit per statute acre, were applied to each plot in addition to the nitrogenous manure. In 1913, the above-mentioned quantities of superphosphate and kainit only were used, no farmyard manure being applied.

MANGELS.

TABLE IV.—Showing the average results of 48 experiments carried out during the five years, 1909-18.

Year.	No. of Experiments.	Nitrogenous Manure Applied.					
		No Nitro- genous Manure.	Nitrate of Soda.	Nitrate of Lime.	Sul- phate of Am- monia.	Calcium Cyana- mide.	Calcium Cyana- mide Mixture.
		Average Yield per Statute Acre.					
		T. C.	T. C.	T. C.	T. C.	T. C.	T. C.
1909,	8	25 9	31 14	32 17	32 10	30 3	—
1910,	10	22 8	27 0	26 2	26 9	25 8	—
1911,	8	31 7	36 6	33 1	36 5	36 9	32 7
1912,	10	19 14	24 13	22 14	24 18	23 17	22 9
1913,	12	26 12	32 10	31 13	32 4	30 8	28 0
Average Yield, 1909-13 (48 experiments)		24 18	30 4	29 1	30 4	28 19	*27 6

* Average of 30 experiments only, 1911-13.

At each centre the mangels received double the quantity of the various nitrogenous manures applied to the three other crops. The remainder of the manurial dressing consisted of farmyard manure, 4 cwts. superphosphate, and 4 cwts. salt, per statute acre.

To sum up, the results for the five years under review indicate that, when applied separately and not as ingredients of a compound mixture, the two nitrogenous manures, calcium cyanamide and nitrate of lime, are, in their effects, not inferior to sulphate of ammonia or nitrate of soda. The application, however, of calcium cyanamide in the form of a specially prepared compound has given, in the case of each crop, a small but consistently lower average yield than any of the other nitrogenous dressings.

If the average figures set forth in the foregoing Tables are carefully studied, it will be seen that there is very little difference in the yields obtained from the application of the various manures to any of the crops reported upon.

The results have not been uniform throughout: in some years the manures have stood in one order of merit; in other years the relative positions have been reversed. For example—to take the results of the experiments with the mangel crop—the highest average yield in the first four seasons was as follows:—

1909,	highest average yield from	Nitrate of Lime.
1910,	“	“ Nitrate of Soda.
1911,	“	“ Calcium Cyanamide.
1912,	“	“ Sulphate of Ammonia.

Whilst these results may appear at first contradictory, this is not really the case ; for (1) none of the manures shows marked superiority or inferiority, and (2) the differences in the average figures are comparatively small and well within the limits of probable error which must be allowed for in experimental work of this nature.

The results of these tests in Ireland are in accord with those obtained from experiments with the same manures carried out in Great Britain, on the Continent, and elsewhere.

Deductions :—The results of the experiments tend to show that, when properly used on suitable soils, the four manures are practically of equal value per unit of nitrogen.

Since, however, these two new fertilisers are more difficult to handle and store than the older manures, they should not receive preference by farmers unless they are substantially cheaper per unit of nitrogen.

Farmers generally are conversant with the characteristics and uses of nitrate of soda and sulphate of ammonia, but as calcium cyanamide and nitrate of lime are of recent introduction, a brief description of the principal features of these manures may be of interest.

Calcium cyanamide or “ Nitrolim,” as sold commercially hitherto,

Calcium	is a dark, fine, heavy powder. It is usually guar-
Cyanamide.	anteed to contain about 18 per cent. of nitrogen ;
	it also contains a quantity of caustic lime.

As regards its nitrogen content, quickness of action and several other properties, calcium cyanamide closely resembles sulphate of ammonia, and the nature and uses of the new manure will be readily understood when it is stated that it is suitable for most of the purposes for which sulphate of ammonia is employed. Calcium cyanamide, however, possesses several important characteristics which require notice :—

(1) It seldom gives satisfactory results if applied to sour, peaty or light sandy soils, and its use on such land is not recommended.

(2) Calcium cyanamide requires to be harrowed in or otherwise covered with soil as soon as possible after application ; if this is not done, loss of nitrogen is liable to occur. As the manure is more suitable for tillage crops than for grass land, its admixture with the soil presents little difficulty. It is best applied a short time previous to, or at the time of, sowing.

In the case of potatoes, it is recommended that calcium cyanamide be applied before the land is drilled, in order that the manure shall not come in contact with the “ sets.”

(8) Owing to its caustic nature, it is not advisable to apply calcium cyanamide in its raw state, as a top dressing for crops with broad delicate leaves on which the manure is likely to collect.

(4) For the same reason, discomfort is often experienced by men sowing the raw manure by hand, especially when the skin is moist from perspiration.

These drawbacks can be largely overcome by mixing Nitrolim with other artificials, especially potassic manures, or with from three to four times its bulk of fine earth or sand. If the earth or sand is dry, the mixture should be sprinkled with water and the heap spread out in a dry shed, in a layer about a foot deep, until cool.

(5) Calcium cyanamide may be mixed safely with:—

- (a) All potassic manures: i.e., kainit, muriate of potash, and sulphate of potash. Mixtures composed of calcium cyanamide and a potash manure only, should be used immediately.
- (b) Basic slag (this mixture is rather dusty).
- (c) Bone meal, bone flour, raw guano.

On no account must calcium cyanamide be mixed with sulphate of ammonia.

Calcium cyanamide can be, and frequently is, mixed with superphosphate; but it should be remembered that when calcium cyanamide is compounded with any manure such as superphosphate, dissolved bones, dissolved guano, containing water, soluble phosphate, some or all of this phosphate is “reverted” to “citric soluble” phosphate.

When calcium cyanamide is mixed with superphosphate, considerable heat is evolved. If such a mixture is to be made on the farm, the following procedure is recommended: If a potassic manure is to form part of the mixture, this should be mixed with the calcium cyanamide first; superphosphate should then be added to the calcium cyanamide and potash mixture in thin layers at a time; if the heap gets hot during the mixing, water should be sprinkled over it, care being taken, however, not to add too much or the heap will become pasty.

(6) Care should be taken to store calcium cyanamide in a dry place; if the manure becomes damp it will swell and burst the bags.

Nitrate of lime closely resembles nitrate of soda in its chemical and physical properties. Both are soluble, quick-acting fertilisers containing nitrogen in a form immediately available as plant food. The two manures, therefore, may be used in practically the same way and for the same purposes.

Nitrate of lime is generally sold on a guarantee of from 12 to 18 per cent. nitrogen. Nitrate of soda contains about 15·5 per cent. nitrogen, therefore a ton of this manure contains approximately as much nitrogen as is present in 25 cwt. of nitrate of lime.

There is one serious difficulty attending the use of nitrate of lime, viz., that if exposed to the air or damp, the manure rapidly becomes pasty or even liquid in form. For this reason nitrate of lime is supplied in casks, and these should not be opened except immediately before the manure is to be applied. On this account, also, nitrate of lime is quite unsuitable for mixing with other artificial manures. The greatest care should be taken to store it in a dry place, and even then it is inadvisable to hold over supplies of this manure for any length of time.

It is generally more satisfactory to spread the manure by hand rather than by machine. It should be applied on a dry day, and the person sowing the manure is recommended to wear gloves, or to thoroughly grease his hands, as sores are apt to be caused by prolonged contact with the nitrate of lime.

The introduction of these two new nitrogenous manures is of the utmost importance to the agricultural community. Nitrogenous manures have always been the most expensive fertilisers the farmer has had to buy, and the discovery of a fresh source of supply is likely to have the effect of reducing the price of nitrogenous manures. The production of calcium cyanamide and nitrate of lime has greatly increased within the last few years, and there is every reason to believe that the present output will be considerably augmented in the near future.

It is probable also that it will be found possible to place the manures on the market in a form in which they can be easily handled.

In view of these considerations, the Department would recommend farmers to give one or both of the new manures a trial on a small scale whenever they can be purchased at prices comparing favourably with nitrate of soda or sulphate of ammonia.

The following example illustrates a method of arriving at the relative value of the different manures: Assuming the current unit value of nitrogen to be 16s., the relative values of the four manures per ton would be :—

Sulphate of Ammonia,	20	per cent. nitrogen	£16	0	0
Calcium Cyanamide,	18	„ „	14	8	0
Nitrate of Soda,	15·5	„ „	12	8	0
Nitrate of Lime,	18	„ „	10	8	0

EELWORMS IN NARCISSUS BULBS.

These eelworms, belonging to the species known as *Tylenchus devastatrix*—minute creatures measuring from $\frac{1}{32}$ to $\frac{1}{16}$ inch in length, and recognisable only by microscopic examination—are well known as injurious to oats, clover, and many other cultivated plants, including onions and other bulbs. Their ravages in Narcissus bulbs have lately been so serious that some special observations and experiments were considered advisable in order to determine the method of migration of the worms from bulb to bulb, and to test the efficacy of various solutions as preventives or remedies. A series of trials has been made extending over an entire year—from October, 1912, to November, 1913.

Accounts of the structural characters of these worms may be found in E. A. Ormerod's Report on Injurious Insects, 1897, and in L. Reh's zoological contributions to Sorauer's *Handbuch der Pflanzenkrankheiten*, Vol. 3, 1906 (pp. 16-26).

The objects of the experiments were :—

- (1) To find if any infection can take place from infected to healthy bulbs in the soil ; if so, how quickly, and in what way.
- Experiments.** (2) To determine the mode of entrance, whether by the crown or roots.
- (3) To find a method of killing the worms without injuring the bulbs.
- (4) To find not only a remedy but a preventive from attacks by eelworms in the soil.

In some cases the worms travel so deeply into the bulbs that it is extremely difficult to get a solution strong enough to penetrate and to kill the worms without injury to the bulbs.

Infected bulbs do not present any abnormal appearance outwardly, but badly-infected bulbs feel light and soft when squeezed, while slightly infected bulbs feel hard and as heavy as uninjured bulbs. When a bulb is cut, the damage is very apparent along dark coloured tracks between the scale leaves, running in curved lines along the leaf contours, and particularly across their base. The worms appear to find better pabulum in this latter situation, and whether they enter by the crown or roots, this is where they congregate so as to cause most damage. As a consequence, badly damaged bulbs can easily be pulled in two, the root portion separating from the leaves.

The damaged portion is brownish or brownish-black in a half decayed condition, not very moist, soft and spongy in appearance.

A little of this material moistened and examined under a microscope is found to be full of worms with their eggs and young.

A number of bulbs were soaked in different solutions for different intervals. They were then cut, and material from all damaged parts were examined in order to ascertain if the worms had all been killed. A number of these bulbs were planted to see, whether in case all the worms had not been killed, they could infect healthy, unsoaked bulbs. Duplicate plots were planted with soaked healthy bulbs mixed with unsoaked infected bulbs, to find if the solutions would prevent contamination. The bulbs were soaked by immersing them in the solutions in earthenware vessels. After having been dried, some of them were examined in order to determine the condition of the worms, and the remainder were planted.

The following is a list of the solutions tried, the time for which each lot was soaked, and the subsequent uses made of the bulbs.

TABLE I.

No.	Solution.	Time Soaked.	Soaked Bulbs Examined.	Soaked Bulbs Planted.
1	Formalin, 5%	2 and 5 hours	Infected only	Healthy and infected
2	" 10%	1 and 2 "	"	"
3	Copper Sulphate, 10%	7 and 24 "	"	"
4	" 7½%	7 and 17 "	"	Infected only
5	" 5%	7 and 17 "	"	"
6	Cresylic Acid, 2%	1 and 2 "	"	"
7	Paraffin Undiluted	½ and 1 "	"	Healthy only

The healthy bulbs were perfectly sound and did not require examination. Soaking them was tried as a preventive and to see if the solutions would injure the growing of the bulbs.

The soaked infected bulbs were planted mixed (row about) with unsoaked, healthy ones, and the soaked healthy bulbs were planted mixed with unsoaked infected bulbs. Solutions 4 and 5 were thought not to injure the bulbs, and therefore no healthy bulbs were soaked in them. Paraffin does not penetrate into the bulbs.

The following is a list of the plots planted :—

TABLE II.

- Plot I. Control; Healthy bulbs.
 „ II. Control; Infected bulbs.
 „ III. Unsoaked healthy and infected bulbs segregated.
 „ IV. Unsoaked healthy and infected bulbs mixed.
 „ V. Healthy, soaked 7 hours in 10% Copper Sulphate solution. Mixed with unsoaked infected.
 „ VI. Healthy, soaked 24 hours in 10% Copper Sulphate solution. Mixed with unsoaked infected.

TABLE II.—*continued.*

Plot VII.	Healthy, soaked 2 hours in 5% Formalin solution. Mixed with unsoaked infected.
„ VIII.	Healthy, soaked 5 hours in 5% Formalin solution. Mixed with unsoaked infected.
„ IX.	Infected, soaked 7 hours in 10% Copper Sulphate solution. Mixed with unsoaked healthy.
„ X.	Infected, soaked 24 hours in 10% Copper Sulphate solution. Mixed with unsoaked healthy.
„ XI.	Infected, soaked 2 hours in 5 % Formalin solution. Mixed with unsoaked healthy.
„ XII.	Infected, soaked 5 hours in 5% Formalin solution. Mixed with unsoaked healthy.
„ XIII.	Infected, soaked 7 hours in 7.5% Copper Sulphate solution. Mixed with unsoaked healthy.
„ XIV.	Infected, soaked 17 hours in 7.5% Copper Sulphate solution. Mixed with unsoaked healthy.
„ XV.	Infected, soaked 7 hours in 5% Copper Sulphate solution. Mixed with unsoaked healthy.
„ XVI.	Infected, soaked 17 hours in 5% Copper Sulphate solution. Mixed with unsoaked healthy.
„ XVII.	Infected, soaked 1 hour in 10% Formalin solution. Mixed with unsoaked healthy.
„ XVIII.	Healthy, soaked 1 hour in Paraffin. Mixed with unsoaked infected.
„ XIX.	Healthy, soaked $\frac{1}{2}$ hour in Paraffin. Mixed with unsoaked infected.
„ XX.	Healthy, soaked 1 hour in 10% Formalin. Mixed with unsoaked infected.

The plots were planted in October, 1912, and from Plots III. and IV. bulbs were lifted at intervals, in order to see if contamination was taking place. During March and April all the bulbs in Plots II., V., VI., XVIII., XIX. and XX. were lifted, and about half the bulbs in the remainder of the plots. These were all examined, and a separate record kept of each bulb. In no case did the worms appear to have invaded the healthy bulbs. It was thought necessary from the negative results of the examination to allow the remainder to remain in the soil until the autumn for further information. A few infected bulbs were kept in the laboratory for experimental purposes. Attempts were made to hatch the eggs and rear the young, but although a number hatched, all the young worms died. In these bulbs, about January, 1913, almost all the eggs had hatched, and the worms in an immature condition were gathered together in masses, giving the damaged material a mildewy appearance, when the bulb was broken. Attempts were made to rear some of these, but unsuccessfully.

It should be mentioned that the Root Mite (*Rhizoglyphus echinopus*) was found in some of the bulbs in conjunction with the worms. In a few bulbs large numbers were present and seemed to have caused considerable damage. The damage done by them was more external than that caused by the eelworms, as they apparently eat their way inwards, damaging the outer scale leaves, giving the bulb a withered appearance and rendering it soft to the touch; while the worms seem to make their way far inwards and then to eat their way out, their presence not being detectable until considerable damage has been done, the bulb retaining a sound appearance and feeling quite hard when squeezed.

A number of bulbs were examined for both mites and worms, to see if the presence of one pest accounted for the presence of the other; but while a large number of bulbs were infested with both, many others had either mites or worms alone. It may be concluded, therefore, that either mites or eelworms can injure the bulbs independently, and that neither is present simply as a follower of the other. No mites survived any of the soakings; they are more easily reached by the solutions than are the eelworms.

The following Table shows the results obtained from the examination of bulbs immediately after soaking, and therefore indicates approximately the condition of the worms in the bulbs when planted.

A number of bulbs also were examined which had been soaked in water at 120° F. for 1, 3, and 6 hours respectively, and one lot soaked $\frac{1}{2}$ hour in 5% Formalin. The result of this examination is included in the Table. Soaking in hot water kills the bulb.

TABLE III.

Solution.	Hours Soaked.	Condition of Worms.
Water, 120° F.	1	All dead
" "	3	"
" "	6	"
Formalin, 5%	$\frac{1}{2}$	Only a few worms dead.
" 5%	2	Worms still alive in the centre of the bulb
" 5%	5	" " "
" 10%	1	All apparently dead
" 10%	2	" "
Copper Sulphate, 10%	7	" "
" 10%	24	" "
" " 7½%	7	A few alive in the centre of one bulb, in the others all dead
" " 7½%	17	All apparently dead
" " 5%	7	" "
" " 5%	17	" "
Cresylic Acid, 2%	1	Worms alive in centre of bulbs
" 2%	2	"
" 5%	1½	" (only one bulb soaked)
Paraffin	$\frac{1}{4}$	"
"	1	"

Experiments were also tried as to the direct action of the solutions on the eelworms. A quantity of the injured material containing live worms was put into a watch glass, a few drops of solution dropped on to it, and the time observed for which the worms survived. This was repeated with each solution. It took 5% Formalin $\frac{1}{2}$ to 1 hour, 10% Formalin 20 to 30 minutes, Cresylic Acid and the Copper Sulphate solutions only a few seconds to kill all the worms. All the solutions, therefore, kill the worms, if given enough time, Copper Sulphate being the most effective. So it is a question of getting the solutions to penetrate deeply enough to reach the worms. This depends on the size and extent of injury done to the bulb. Bulbs badly damaged are more easily saturated than those only slightly infected, the solution being able to penetrate the former more easily than half damaged material.

As mentioned already, many of the bulbs in the experimental plots were raised and examined after the flowering season in March and April. The following Table shows the results of the examination and the effect of the solutions on the bulbs.

TABLE IV.

Solution.	Hours Soaked	Condition of Worms.	Condition of Bulbs.
Formalin, 5%	2	Worms still alive in the centre of a few bulbs; in the others all dead	Uninjured by solution
„ 5%	5	Similar result	„
„ 10%	1	„	„
„ 10%	2	„	„
Copper Sulphate, 10%	7	„	Badly injured
„ 10%	24	None found alive	„
„ 7½%	7	Worms alive in the centre of a few bulbs	Slightly injured
„ 7½%	17	„	„
„ 5%	7	„	Very slightly injured. Some uninjured and growing well
Cresylic Acid, 2% 5%	17	„	„
„ 2%	1 & 2	Worms alive in the centre of bulbs	Slightly injured
Paraffin	$\frac{1}{2}$	No infested bulbs soaked	Bulbs not growing, decaying
„	1	„	„

The above results differ slightly from those recorded in Table III. The Formalin (10% for 1 and 2 hours), and the Copper Sulphate (10% for 7 hours, 7·5% for 17 hours, and 5% for 7 and 17 hours) did not

prove themselves to be as efficient in the soil as they apparently are immediately after application in the laboratory. The difference may be due to eggs remaining unaffected by the solutions, or the solutions may not have penetrated deeply enough to kill all the worms; the latter was most likely the real cause. It was observed that no living insects, millipedes, or worms of any kind were found on or near the bulbs that had been soaked in the solutions of Copper Sulphate, whilst on a large number of the other bulbs, soaked and unsoaked, millipedes, springtails, and free-living nematodes were found foraging. The millipedes had caused a good deal of damage to a number of bulbs and had prevented them from rooting. The other insects and worms had probably followed these or the eelworms, as they feed on decaying vegetable material.

The effect of the solutions on the bulbs is important. The Copper Sulphate in the stronger solution appears to injure the bulbs badly, while the weak solutions do not injure the bulbs to any great extent.

A large number of unsoaked infected bulbs were also examined, and the result was rather surprising; for, as in the case of the soaked infected bulbs, all or most of the worms were dead. Bulbs badly infected at planting were found to be badly decayed and the worms apparently all dead when lifted in March. A careful examination of the adjoining healthy bulbs and soil did not show that they had migrated or were migrating; apparently they had died off. In the partially infected bulbs, the worms, although in a very inanimate condition, were alive, but did not appear to be carrying on much destruction. No migration from injured to healthy bulbs could be detected and the results point to a great reduction in the numbers of the eelworms during the winter months. It is evident that they carry on their ravages chiefly during the summer in the more or less dormant bulbs, either when lifted and stored or when allowed to remain in the soil. No contamination was found to have taken place from the infested to the healthy bulbs in either Plots III. or IV., or in any of the other mixed plots. As spring advances, the worms appear to become more animated, and their increased activity in summer was shown by an examination later in the year of the remaining bulbs.

The remainder of the bulbs were lifted between the 20th October and 1st November. The dry summer had been favourable to the worms, and migration had taken place to a considerable extent; the worms had been very busy and had caused a considerable amount of infestation among the healthy bulbs. The worms were apparently dying off rapidly, as had been observed in the preceding autumn. Only a few were found alive in any of the bulbs, the great

majority being dead or in a very inanimate state. Of the sick bulbs very few contained live worms, those that had been badly infested, whether soaked or unsoaked, were chiefly in a bad state of decay. A number had decayed completely away and no trace of them could be found.

The mode of entrance was clearly demonstrated. In a number of bulbs the worms had entered by the crown and had only got about half way down between the scale leaves. In others they had reached the base of the scale leaves, while in the majority they had about one half of the bulb in a badly damaged condition. The bulbs were all fairly free from the insects and worms, and only in very few the Root mite (*Rhizoglyphus echinopus*) was observed. None of the damage could be attributed to its presence as worms were also found in conjunction with it.

The following Table shows the plots in which infestation took place, and the extent of the injury :—

TABLE V.

Plot.	Remarks.	Solution.	Time.	Number of healthy Bulbs infected.
I.	Control (Healthy)	—	—	None
III.	Segregated	—	—	3 out of 18
IV.	Mixed	—	—	19 out of 21
VII.	Healthy soaked	Formalin, 5%	2 hrs.	14 out of 14
VIII.	" "	" 5%	5 "	10 out of 14
IX.	Mixed soaked	Copper Sulphate, 10%	7 "	8 out of 14
X.	" "	" 10%	24 "	0 out of 14
XI.	" "	Formalin, 5%	2 "	2 out of 14
XII.	" "	" 5%	5 "	4 out of 14
XIII.	" "	Copper Sulphate, 7.5%	7 "	2 out of 7
XIV.	" "	" 7.5%	17 "	0 out of 7
XV.	" "	" 5%	7 "	0 out of 5
XVI.	" "	" 5%	17 "	0 out of 5
XVII.	" "	Formalin, 10%	1 "	4 out of 6

In the segregated plot (III.) the worms had travelled about one foot to the healthy bulbs. In the other plots they had only about 6 inches to travel.

The infested bulbs in the mixed plot (IV.) had all decayed away, but the worms had infected the healthy bulbs very badly. These were much more damaged than the contaminated bulbs in the other

plots, a good many were rotten. This is probably due to the sick bulbs, which were very badly infested, having been cut before planting, and thus providing an easy exit for the worms.

It should be noted that less migration took place from the soaked infested than from the unsoaked infested bulbs; this shows that soaking is effective in reducing the migration.

The Copper Sulphate solutions give rather contradictory results, Plots IX. and XIII. show some migration from soaked bulbs; probably the Copper Sulphate got washed away, leaving the worms free to migrate, as the solutions do not kill them all. On the other hand, it is possible that the "healthy" bulbs were in reality contaminated before being planted, but the other results tend to contradict this. It was rather surprising that no live worms were found in the soaked bulbs of Plot IX., nor was there any sign of their recent activity. In Plot XIII., however, there were live worms in one bulb, which would account for the contamination. In the Plots X., XV., and XVI., no contamination had taken place, although each contained one bulb that had worms alive or well preserved, showing sure signs of their having been active during the summer.

Each of the Plots VII. and XVII. had 7 infested bulbs planted VI. to XII. 14, and XIII. to XVII. 5 to 7 healthy bulbs left growing for the summer, but the small number had almost as good a chance of getting contaminated as the larger, as the bulbs containing the live worms were only six inches from healthy bulbs. Plot XIV. had no live worms in any of the bulbs.

The Copper Sulphate in Plots XIII. to XVI. did not appear to have injured the bulbs beyond the damage caused by the worms. Bulbs that had been free from worms when soaked were perfectly healthy and growing well; the others in which the worms had all been killed, although injured more or less, were making a good attempt to grow; what remained undamaged had a healthy appearance and were perfectly free from worms.

The whole results may be summarised as follows :—

1. Gardeners are recommended to soak infested bulbs in some solution strong enough to kill the worms without
- Conclusions.** injury to the bulbs, for a period long enough to penetrate all the damaged tissue.

Copper Sulphate in 10% solution injures the bulb, so that it cannot be recommended. The 7.5% solution does not injure the

bulbs much, and the 5% solution hardly at all. Apparently the latter is as effective as the stronger solutions in killing the worms; and as the weaker solution appears to penetrate better than the stronger, its application for a longer period might give a more satisfactory result, without the risk of injuring the bulbs.

It might be advisable to soak the bulbs soon after they have been lifted in spring; this might prevent migration, and probably would not injure the bulb very much. Copper Sulphate is a good preventive from the attacks of insects, as well as of eelworms, and prevents to some extent at least the migration of pests from bulb to bulb. Formalin does not kill the worms as quickly as the Copper Sulphate, and it is of no value as a preventive; it does not injure the bulbs in any way.

Cresylic Acid does not mix well with water nor penetrate the bulbs, and cannot be recommended. Paraffin completely kills the bulbs, and should not be used.

2. Migration and infection can take place in the soil, but only during the summer months when the bulbs are in a dormant state, and the conditions are more suitable for the activity of the worms. Apparently there is a great deal of mortality among the worms during the winter, wet and cold being adverse to their requirements. There can be no doubt that the worms migrate and carry on their ravages amongst stored bulbs, much more quickly than in those planted, but there is danger of contamination in the soil as well as in storage.

3. The mode of entrance is, as observed by Continental writers, by the crown; the worms work their way down between the scale leaves, finding better pabulum at the base, and very soon ruining the bulb.

T. R. HEWITT.

OFFICIAL DOCUMENTS.

I.—AGRICULTURE.

DEPARTMENT OF AGRICULTURE AND TECHNICAL INSTRUCTION FOR IRELAND.

SCHEME OF AGRICULTURAL EXPERIMENTS.

[The original Scheme of manurial and variety experiments was first put into operation in 1902. The object of the manurial experiments was to ascertain the most suitable combinations of manures for each of the principal farm crops. These experiments were continued until 1911. The superiority of the results from certain mixtures was so uniform throughout the period during which the scheme had then been in operation that further repetition of the tests was not considered necessary after that year. In 1908 a second series of manurial experiments was introduced with a view to determining, in the case of the manures which had given the best results in previous years, what were the most advantageous proportions in which the several ingredients should be mixed. Details of this series of tests, including some additions made in 1911 and 1914, are given in Division A of the following Scheme. Slight changes in the variety experiments have been made from time to time, those varieties which had been sufficiently tested being omitted and new varieties being added when necessary.]

Experiments in the feeding of Live Stock were commenced in 1911. The scheme then adopted was repeated during the 1912-13 season. An entirely new series as detailed in Division B of the Scheme has been introduced for 1913-14.]

Before commencing field experiments and demonstrations each year, each Agricultural Instructor must submit to the County Committee and the Department his plans for the work, showing the number and variety of the experiments and demonstrations which he proposes to conduct and the estimated cost in detail of the seeds, manures, and accessories required.

When his proposals have been approved by the County Committee and the Department, the Instructor should, on behalf of the Committee, order the seeds and manures in the requisite quantities. The Instructor must not, of course, obtain goods for which the Committee are liable for payment without authorisation from the Committee to do so. He should take every precaution to ensure that the seeds and manures are of

the kinds specified in the scheme, and that the prices charged are not in excess of current market rates. The merchants' accounts are to be carefully examined by him, and he is required to certify as to their accuracy before they are presented to the County Committee for payment. Returns in connection with the experiments of each class (manurial, variety, etc.) on the several crops dealt with should be furnished to the Department on the forms supplied for the purpose immediately after the necessary weighings, etc., have been completed on all the plots of any one class from which reliable results can be obtained. Particulars of all experiments of the same class should be furnished together on *one* appropriate form and the averages, etc., indicated on the form fully worked out.

The dates before which the reports dealing with experiments with the different crops must reach the Department are as follows :—

Meadow Hay	..	..	30th September.
Potatoes	..	..	15th November.
Mangels	..	..	30th November.
Turnips	..	..	15th December.
Grain	..	..	21st December.

The Department should be duly informed of the failure of any experiment.

The Instructor should submit to the County Committee, as soon as possible after the completion of his experimental work each season, a report on the results obtained during the season, so that if the Committee desire to publish the report, they may obtain the approval of the Department and have the report circulated among farmers prior to the commencement of the following season's field operations.

The experiments are intended as object-lessons to farmers in the cultivation, manuring, and seeding of land, and should be labelled so that an ordinary observer may be able easily to ascertain what they are intended to show. One label will suffice for each demonstration plot, but in the case of an experiment which includes several plots, a larger label stating the general character of the experiment should be erected in addition to the smaller labels, giving particulars with respect to each of the plots included in the experiment. The labels should be capable of resisting the weather.

No change must be made in any of the manurial experiments as given below, but the Instructor may include such additional plots as local conditions render advisable. In the variety tests, Instructors are required to include all the varieties specified in each list.

Instructors with less than two years' experience of itinerant work must not undertake live stock experiments unless they obtain the Department's special approval for doing so.

A.—SCHEME OF THE FIELD EXPERIMENTS.

I.—Oat Crop (Variety Test).

Size of plots not less than one-eighth or more than a quarter of a statute acre.

The following varieties to be tested :—

- | | |
|---------------------|-------------------------|
| 1. Potato. | 5. Yelder. |
| 2. Black Tartarian. | 6. Banner. |
| 3. Abundance. | 7. Any other varieties. |
| 4. Waverley. | |

II.—Barley Crop (Variety Test).

Size of plots, not less than one-eighth or more than a quarter of a statute acre.

The following varieties to be tested :—

1. Archer.
2. Goldthorpe.
3. Any other varieties.

III.—Wheat Crop (Variety Test).

Size of plots, not less than one-eighth or more than a quarter of a statute acre.

The following varieties to be tested :—

1. Red Fife.
2. Red Chaff White.
3. White Stand-up.
4. White Queen.
5. Any other varieties (preferably include Square-head Master).

IV.—Turnip Crop (Manurial Test with Farmyard Manure).

Size of plots, one-twentieth of a statute acre.

The following kinds and quantities (per statute acre) of manures to be applied :—

No. of Plot.	
1	15 tons farmyard manure.
2	{ 15 tons farmyard manure. 4 cwt. Superphosphate.
3	{ 15 tons farmyard manure. 5 cwt. Superphosphate.
4	{ 15 tons farmyard manure. 6 cwt. Superphosphate.
5	{ 15 tons farmyard manure. 4 cwt. Basic Slag.
6	{ 15 tons farmyard manure. 5 cwt. Basic Slag.
7	{ 15 tons farmyard manure. 6 cwt. Basic Slag.

V.—Turnip Crop (Manurial Test without Farmyard Manure).

{Size of plots, one-twentieth of a statute acre.

The following kinds and quantities (per statute acre) of manures to be applied :—

No. of
Plot.

- | | | |
|---|---|--|
| 1 | { | 4 cwt. Superphosphate. |
| | | 1 cwt. Sulphate of Ammonia. |
| | | 3 cwt. Kainit. |
| 2 | { | 5 cwt. Superphosphate. |
| | | 1 cwt. Sulphate of Ammonia. |
| | | 3 cwt. Kainit. |
| 3 | { | 6 cwt. Superphosphate. |
| | | 1 cwt. Sulphate of Ammonia. |
| | | 3 cwt. Kainit. |
| 4 | { | 4 cwt. Basic Slag. |
| | | 1 cwt. Sulphate of Ammonia. |
| | | 3 cwt. Kainit. |
| 5 | { | 5 cwt. Basic Slag. |
| | | 1 cwt. Sulphate of Ammonia. |
| | | 3 cwt. Kainit. |
| 6 | { | 6 cwt. Basic Slag. |
| | | 1 cwt. Sulphate of Ammonia. |
| | | 3 cwt. Kainit. |
| 7 | { | 6 cwt. of mixture of artificials
applied to Plot 1. |

VI.—Turnip Crop (Variety Test).

Size of plots, each four ridges full length of field.

The following varieties to be tested :—

SWEDES.

1. Improved Purple Top.
2. Best of All.
3. Magnum Bonum.
4. Triumph.
5. Shamrock.
6. Incomparable Green Top (Garton).
7. Any other varieties.

YELLOW TURNIPS.

8. Centenary.
9. Aberdeen Green Top.
10. Any other varieties.

VII.—Mangel Crop (Manurial Test).

Size of plots, one-twentieth of a statute acre.

The following kinds and quantities (per statute acre) of manures to be applied :—

Nb. of
Plot

- | | |
|---|---|
| 1 | 20 tons farmyard manure. |
| 2 | <div style="display: inline-block; vertical-align: middle;"> <div style="display: inline-block; vertical-align: middle; font-size: 3em; line-height: 1;">{</div> <div style="display: inline-block; vertical-align: middle;"> 20 tons farmyard manure.
 3 cwt. Superphosphate.
 2 cwt. Sulphate of Ammonia.
 4 cwt. Salt. </div> </div> |
| 3 | <div style="display: inline-block; vertical-align: middle;"> <div style="display: inline-block; vertical-align: middle; font-size: 3em; line-height: 1;">{</div> <div style="display: inline-block; vertical-align: middle;"> 20 tons farmyard manure.
 4 cwt. Superphosphate.
 2 cwt. Sulphate of Ammonia.
 4 cwt. Salt. </div> </div> |
| 4 | <div style="display: inline-block; vertical-align: middle;"> <div style="display: inline-block; vertical-align: middle; font-size: 3em; line-height: 1;">{</div> <div style="display: inline-block; vertical-align: middle;"> 20 tons farmyard manure.
 5 cwt. Superphosphate.
 2 cwt. Sulphate of Ammonia.
 4 cwt. Salt. </div> </div> |
| 5 | <div style="display: inline-block; vertical-align: middle;"> <div style="display: inline-block; vertical-align: middle; font-size: 3em; line-height: 1;">{</div> <div style="display: inline-block; vertical-align: middle;"> 20 tons farmyard manure.
 4 cwt. Superphosphate.
 1 cwt. Sulphate of Ammonia.
 4 cwt. Salt. </div> </div> |
| 6 | <div style="display: inline-block; vertical-align: middle;"> <div style="display: inline-block; vertical-align: middle; font-size: 3em; line-height: 1;">{</div> <div style="display: inline-block; vertical-align: middle;"> 20 tons farmyard manure.
 4 cwt. Superphosphate.
 3 cwt. Sulphate of Ammonia.
 4 cwt. Salt. </div> </div> |
| 7 | <div style="display: inline-block; vertical-align: middle;"> <div style="display: inline-block; vertical-align: middle; font-size: 3em; line-height: 1;">{</div> <div style="display: inline-block; vertical-align: middle;"> 20 tons farmyard manure.
 4 cwt. Superphosphate.
 2 cwt. Sulphate of Ammonia
 2 cwt. Salt. </div> </div> |
| 8 | <div style="display: inline-block; vertical-align: middle;"> <div style="display: inline-block; vertical-align: middle; font-size: 3em; line-height: 1;">{</div> <div style="display: inline-block; vertical-align: middle;"> 20 tons farmyard manure.
 4 cwt. Superphosphate.
 2 cwt. Sulphate of Ammonia.
 6 cwt. Salt. </div> </div> |
| 9 | <div style="display: inline-block; vertical-align: middle;"> <div style="display: inline-block; vertical-align: middle; font-size: 3em; line-height: 1;">{</div> <div style="display: inline-block; vertical-align: middle;"> 20 tons farmyard manure.
 7½ cwt. of mixture of artificials
 applied to Plot 3. </div> </div> |

VIII.—Mangel Crop (Variety Test).

Size of plots, each four ridges full length of field

The following varieties to be tested :—

- | | |
|--------------------|-------------------------|
| 1. Yellow Globe. | 4. Long Red. |
| 2. Prize Winner. | 5. Any other varieties. |
| 3. Golden Tankard. | |

IX.—Potato Crop (Manurial Test).

Size of plots, one-twentieth of a statute acre

The following kinds and quantities (per statute acre) manures to be applied :—

No. of Plot.	
1	15 tons farmyard manure.
2	15 tons farmyard manure. 3 cwt. Superphosphate. 1 cwt. Sulphate of Ammonia. 1 cwt. Muriate of Potash.
3	15 tons farmyard manure. 4 cwt. Superphosphate. 1 cwt. Sulphate of Ammonia 1 cwt. Muriate of Potash.
4	15 tons farmyard manure. 5 cwt. Superphosphate. 1 cwt. Sulphate of Ammonia. 1 cwt. Muriate of Potash.
5	15 tons farmyard manure. 4 cwt. Superphosphate. 1½ cwt. Sulphate of Ammonia. 1 cwt. Muriate of Potash.
6	15 tons farmyard manure. 4 cwt. Superphosphate. 2 cwt. Sulphate of Ammonia. 1 cwt. Muriate of Potash.
7	15 tons farmyard manure. 4 cwt. Superphosphate. 1 cwt. Sulphate of Ammonia. 1½ cwt. Muriate of Potash.
8	15 tons farmyard manure. 4 cwt. Superphosphate. 1 cwt. Sulphate of Ammonia. 2 cwt. Muriate of Potash.
9	15 tons farmyard manure. 4½ cwt. of mixture of artificials applied to Plot 3.

X.—Potato Crop (Variety Test).

Size of plots, one-fortieth of a statute acre.

The following varieties to be tested :—

<i>Maincrop.</i>	6. Old Champion.
1. Up-to-Date.	7. Arran Chief.
2. Duchess of Cornwall.	8. Any other varieties.
3. Summit.	<i>Mid-Season.</i>
4. Irish Queen.	9. British Queen.
5. Shamrock.	10. Abundance.
	11. Any other varieties.

XI.—Experiment with Potatoes to test the Effects of the Introduction of New Seed from different districts.

Seed for this experiment (except that used in Plot 1) will be supplied by the Department. The seed for all plots is to be of the Up-to-Date variety.

It is hoped to supply seed of uniform quality for plots 2 to 7, inclusive. The farmer's homegrown seed for Plot 1 should be of similar size as that supplied for the other plots, and it should be treated in the same way as regards sprouting. The seed for all plots is to be planted whole.

Size of plots, one-fortieth of a statute acre.

No. of Plot	No. of Plot
1. Farmer's homegrown seed.	5. Seed grown in Connaught.
2. Seed grown in Ulster.	6. „ „ England.
3. „ „ Munster.	7. „ „ Scotland.
4. „ „ Leinster.	

NOTE.—The produce of these plots need not be retained. The Department will supply fresh seed from the same sources each season for two or three years to enable Instructors to repeat the experiment—not necessarily on the same farms.

XII.—Experiment with Potatoes to test the Effects of Improved Methods of Cultivation.

This experiment is designed to show the combined effect resulting from the sprouting of the seed, the application of artificial manures and the spraying of the crop.

Seed of the same stock is to be planted in both plots in the experiment.

Size of plots, one-twentieth of a statute acre.

Plot 1. The seed for this plot is to be planted whole and to be taken directly from the pit at the time of planting, only 20 tons per statute acre of farmyard manure to be applied and the crop left unsprayed.

Plot 2. Similar seed as for Plot 1, but it must have been previously sprouted in boxes; 6 cwt. per statute acre of the mixture of artificial manures recommended by the Department for potatoes to be applied in addition to 20 tons of farmyard manure per statute acre, and the crop to be sprayed twice.

XIII.—Potato Crop (Boxing Test).

Size of plots, one-twentieth of a statute acre.

1. "Seed" boxed before December 1st.
2. Unsprouted seed.

XIV.—Potato Crop (Spraying Test).

Size of plots, one-tenth of a statute acre.

(120 gallons of mixture to be applied per statute acre at each spraying.)

The following to be compared :—

No. of
Plot.

1. Unsprayed.
2. Effect of a 1 per cent. lime or Bordeaux mixture, double application.
3. Effect of a 2 per cent. lime or Bordeaux mixture, single application.
4. Effect of a 2 per cent. lime or Bordeaux mixture, double application.
5. Effect of a 1 per cent. soda or Burgundy mixture, double application.
6. Effect of a 2 per cent. soda or Burgundy mixture, single application.
7. Effect of a 2 per cent. soda or Burgundy mixture, double application.

XV.—Destruction of Charlock (Preshaugh) and other Weeds (Spraying Test).

Size of plots, one-tenth of a statute acre.

The following solutions will be tested :—

1. Unsprayed.
2. 50 gallons 3 per cent. Sulphate of Copper.
3. 80 gallons 3 per cent. Sulphate of Copper.

XVI.—Improvement of Second Class Pasture.

Improvement to be estimated by Observation.

Size of plots, one-quarter of a statute acre.

The following kinds and quantities (per statute acre) of manures to be applied :—

- 1 5 cwt. Basic Slag (high grade).
- 2 { 5 cwt. Basic Slag (high grade).
2 cwt. Kainit.
- 3 10 cwt. Basic Slag (high grade).
- 4 { 10 cwt. Basic Slag (high grade).
2 cwt. Kainit.
- 5 5 cwt. Potassic Superphosphate.
- 6 10 cwt. Potassic Superphosphate.

XVII.—Influence of Seed Mixtures in forming Pasture.

Land selected to be left in grass for not less than two years.

Size of plots, not less than one-tenth or more than one-fourth of a statute acre.

The following mixtures to be tested :—

Plot 1.

- 1 bushel Italian Rye Grass (22 lb. per bushel).
- $\frac{1}{2}$ bushel Perennial Rye Grass (28 lb. per bushel).
- 4 lb. Red Clover.
- 2 lb. White Clover.

Plot 2.

- 1 bushel Perennial Rye Grass (28 lb. per bushel).
- $\frac{1}{2}$ bushel Italian Rye Grass (22 lb. per bushel).
- 4 lb. Red Clover.
- 2 lb. White Clover.

Plot 3.

- 18 lb. Perennial Rye Grass.
- 9 lb. Italian Rye Grass.
- 3 lb. Timothy.
- 3 lb. Cocksfoot.
- 4 lb. Broad Red Clover.
- 2 lb. Alsike Clover.
- 1 lb. White Clover.

Plot 4.

- 15 lb. Perennial Rye Grass.
- 7 lb. Italian Rye Grass.
- 4 lb. Meadow Fescue.
- 3 lb. Timothy.
- 3 lb. Cocksfoot.
- 4 lb. Broad Red Clover.
- 2 lb. Alsike Clover.
- 2 lb. White Clover.

Plot 5.

At the discretion of the Instructors the following mixture (Elliot's) may be tested, but only on poor thin land:—

					Quantity of Seed per acre lb.
Cocksfoot .. .. .	..	..	..	..	10
Meadow Fescue .. .. .	..	..	..	..	5
Tall Fescue .. .. .	..	..	..	..	4
Tall Oat-like Grass .. .. .	..	..	..	..	3
Hard Fescue .. .. .	..	..	..	..	1
Rough-stalked Meadow Grass .. .. .	..	..	..	..	$\frac{1}{2}$
Smooth-stalked Meadow Grass .. .. .	..	..	..	..	1
Golden Oat Grass .. .. .	..	..	..	..	$\frac{1}{2}$
Italian Rye Grass .. .. .	..	..	..	..	3
White Clover .. .. .	..	..	..	..	2
Alsike Clover .. .. .	..	..	..	..	1
Late-flowering Red Clover .. .. .	..	..	..	..	2
Kidney Vetch .. .. .	..	..	..	..	$2\frac{1}{2}$
Chicory .. .. .	..	..	..	..	3
Burnet .. .. .	..	..	..	..	8
Sheep's Parsley .. .. .	..	..	..	..	1
Yarrow .. .. .	..	..	..	..	$\frac{1}{2}$

XVIII.—Liquid Manure Experiments.

(a) On First Crop Hay or Old Meadow, preferably the former.

Size of plots, one-sixteenth of a statute acre (for small farm, each plot may be one-fortieth of a statute acre).

The following kinds and quantities (per statute acre) of manures to be applied :—

No. of
Plot.

1. No manure.

2. 16 tons farmyard manure, applied before 15th February.

3. 16 tons liquid manure, applied one-half in February and one-half in April.

4. $\left\{ \begin{array}{l} 1 \text{ cwt. Nitrate of Soda, applied during last half of March.} \\ 2 \text{ cwt. Superphosphate} \\ 2 \text{ cwt. Kainit} \end{array} \right\}$ applied before 15th February.

(b) On Cabbages.

No. of
Plot.

1. No manure—size of plot, 1 square perch.

2. 20 tons farmyard manure—size of plot, 4 square perches.

3. 20 tons liquid manure—size of plot, 4 square perches.

B.—SCHEME OF EXPERIMENTS IN THE FEEDING OF LIVE STOCK.

In carrying out experiments with Live Stock many unexpected difficulties will be met with by Instructors. They are, accordingly, advised to undertake only a few experiments of this nature until they have gained experience of the work.

Selection of Farm.

In selecting farmers with whom to locate experiments in the feeding of Live Stock only those should be considered who have been in the habit of feeding pigs, in the case of experiments with pigs, and cattle in the case of experiments with cattle. Experiments should be undertaken only where full facilities for weighing the animals exist on the farm or in its neighbourhood.

Marking.

All the animals in the experiments should be properly marked for identification, and it is suggested that this could best be done by ear marks, i.e., by cutting notches out. A simple and cheap instrument would then suffice for marking all kinds of stock.

Records.

The herd or other person who is responsible for attending to the feeding operations should keep notes of matters affecting the progress of the experiment, e.g., periods when animals did not fully consume their rations, etc.

Valuing.

Notes should be made by the Instructor of the appearance and value of the animals in the different lots at the beginning and end of the experiment.

Excluding Animals from the Experiment.

If for any reason such as sickness, accident or death any animal is removed from either lot in an experiment, a corresponding animal should be removed from the remaining lot. Particulars as to the foods given to the excluded animals before being removed should be omitted from the returns given in the general report on the results of the experiment.

Weighing of Animals.

The animals are to be weighed at the beginning and at the end of every experiment. It is most important that the weighings should in each case be made under similar conditions, i.e., if at the beginning of the experiment the animals are weighed in the morning after feeding they should be weighed at the same time and under the same conditions at the end of the experiment.

In the case of Experiment V., Fattening of Cattle in Stalls the animals should not be weighed immediately they are tied up off the grass. Before the commencement of the experiment both lots of cattle should be fed alike for at least one week after they are tied up, and they should be weighed at the end of that period.

With regard to pigs, no difficulty will be experienced in weighing the animals at the beginning of the experiment. Where, however, it is not possible to obtain the live weight of the different pigs, at the end of the experiment these should be calculated, allowing 25 per cent. for loss in killing, and the individual weights so arrived at should be included in the figures submitted to the Department.

Subsidy.

To compensate farmers for the trouble involved in carrying out experiments, a subsidy may be given, subject to the concurrence of the County Committee, calculated on the basis of a certain sum in respect of each animal fed. The maximum amount which may be granted in the case of each class of experiment is given below, but Instructors will, no doubt, be able to arrange in many cases for the carrying out of the experiments at a cost much below the maximum allowable. In addition, a small sum may be given as a gratuity to the farm-hand who is in charge of the immediate work of the experiment. The Instructor should impress on the experimenters that payment of the subsidy will depend on his instructions being satisfactorily carried out. Before any experiment is begun, the Instructor should, of course, obtain the County

Committee's and the Department's approval of his proposals for same, which should be submitted in detail.

Further particulars in regard to each class of experiment are given hereunder:—

PIGS.

I.—Experiment to ascertain the value of cooked meals as compared with uncooked meals, for pig feeding.

Details of Experiment.

Lot 1. Cooked meals.

Lot 2. Uncooked meals.

Both lots are to receive equal quantities of the same mixture of meals, and it is suggested that equal parts of Indian meal and pollard be used at the commencement of the experiment. Separated milk or buttermilk, and potatoes, may be given provided both lots are treated alike in this respect. If potatoes are used they must be given cooked to both lots.

The only difference in the treatment of the two lots must be that the meals for Lot 1 are given cooked and the meals for Lot 2 are fed uncooked. The cooked meals may be either scalded or boiled, and the raw meals are to be damped with cold water.

Drinking water should be provided for the pigs in Lot 2.

Not less than three animals are to be included in each lot. The maximum number of animals in each lot must depend on the funds at the disposal of the Instructor. Pigs should not be less than ten weeks or more than fourteen weeks old at the commencement of the experiment. If possible, pigs between the ages of twelve and fourteen weeks should be selected.

Subsidy for Experiments.

The maximum subsidy payable is 10s. per pig (in addition to the allowance for the farm hand, which must not exceed 10s. for an entire experiment). The total grant in respect of each experiment must not exceed £5 10s.

CATTLE.

II.—Experiment on the Feeding of Calves.

Details of Experiment.

Lot 1. Calf meal recommended by the Department in Leaflet No. 54, viz. :—

2	parts	by weight	of Oatmeal.
2	"	"	Indian meal.
1	"	"	pure ground Flax seed.!

Lot 2. Indian meal alone.

Equal quantities of meal are to be fed to both lots.

A small allowance of linseed cake and crushed oats, mixed in equal proportions, may be given to both lots.

Calves should not be less than four weeks or more than eight weeks old at the commencement of an experiment. The average age of both lots of calves should be as nearly uniform as possible. The minimum number of calves in each lot is to be three. The maximum number must depend on the funds at the Instructor's disposal. The period of experimental feeding should be sixteen weeks.

Subsidy for Experiment.

The maximum subsidy payable is 10s. per calf (in addition to the allowance for the farm hand, which must not exceed 10s. for an entire experiment). The total grant in respect of each experiment must not exceed £5 10s.

III.—Experiment on the Fattening of Cattle on Grass.

Details of Experiment.

This experiment is designed to ascertain whether it is profitable to feed cake and meal to two or three-year-old store cattle on grass, when the pasture is not of first rate quality and when the cattle are intended to be sold fat before autumn.

Lot 1. Cake and meal; mixture composed of:—

2 parts undecorticated cotton cake.

1 part Indian meal.

Lot 2. No cake and meal.

The quantity of the mixtures to be fed to Lot 1 is to commence at 3 lb. per head daily and to increase to 5 lb. per head daily.

The experiment should begin in May and continue for not less than twelve weeks.

The lots are to be fed in two fields and interchanged fortnightly or weekly.

The minimum number of cattle in each lot is to be four. The maximum number must depend on the funds at the Instructor's disposal.

At the end of twelve weeks, or later, when the experiment is concluded, the cattle in Lot 1 will likely be fat and ready for sale, while the cattle in Lot 2 will not be so forward in condition. At the close of the experiment, therefore, it will be necessary to have both lots of cattle valued as well as weighed. If one or both lots are sold the actual prices realised should be given.

Subsidy for Experiment.

The maximum subsidy payable is 10s. per head (in addition to the allowance for the farm hand, which must not exceed 10s. for an entire experiment). The total grant in respect of each experiment must not exceed £6 10s.

IV.—Experiment on the Fattening of Cattle in Stalls.*Details of Experiment.*

The objects of this experiment are to ascertain whether cattle can be fed as profitably on a small as on a large ration of roots, and whether part of the roots can be replaced by a mixture of cake and meal in the proportion of 1 lb. meal mixture to 1 stone of roots.

Lot 1. 6 stones roots.

Lot 2. 3 ,,

The concentrated food to be fed to both lots is to consist of a mixture of equal parts of decorticated cotton cake, Indian meal and crushed oats. The quantity of the meal mixture to be given to Lot 1 is to commence at 3 lb. and may increase to 8 lb. per head daily. *Throughout the experiment the cattle in Lot 2 are to receive 3 lb. per head daily of the meal mixture more than those in Lot 1.*

If linseed cake is used during the last stage of the fattening period similar quantities must be fed to both lots, but linseed cake must not be substituted for any portion of the meal mixture referred to above. Equal quantities of the same kind of fodder must be given to both lots.

Drinking water must be offered to all the cattle daily. The minimum number of cattle in each lot is to be four. The maximum number must depend on the funds at the Instructor's disposal. The period during which the experimental feeding is to continue must not be less than ten weeks.

Subsidy for Experiment.

The maximum subsidy payable is £1 per head (in addition to the allowance for the farm hand, which must not exceed 10s. for an entire experiment). The total grant in respect of each experiment must not exceed £10 10s.

December, 1913.

DEPARTMENT OF AGRICULTURE AND TECHNICAL INSTRUCTION FOR IRELAND.

NORTH-WEST AGRICULTURAL SCHOOL, STRABANE.

Courses of Instruction in Agriculture for young men, and in Poultry-keeping, Buttermaking and Domestic Economy for young women, will be provided at the above School.

The courses will be open to resident students only. Accommodation for twenty-four students has been provided. Courses for male students will be held during the winter, and for female students during the summer.

The first course of instruction for young men will open on the 27th January, 1914, and will be of six weeks' duration.

Applicants for admission to this course must be not less than seventeen or more than thirty-five years of age on the opening date of the course, and must be actually engaged in farm work. Those applicants who have attended, prior to the 1st October, 1913, a class under the Department's Scheme of Winter Agricultural Classes, and made satisfactory attendance and progress thereat, will receive a preference in regard to admission, and be exempt from the entrance examination. Other applicants will be submitted by the Department to a simple examination to test their ability to take advantage of the instruction provided, and those who attain the qualifying standard will be admitted, so far as places are available, in the order of the receipt of their applications in the Department's Offices.

Instruction will be given at this course in Agriculture and in Veterinary Hygiene. In connection with both these subjects, practical demonstrations will be given.

Practical instruction in gardening will also be provided.

Eight scholarships, entitling the holders to free board and instruction during the course, are being provided by each of the County Committees of Agriculture of Counties Donegal, Londonderry, and Tyrone, for applicants resident in their respective counties.

Applications in regard to the Scholarships should be addressed to the Secretaries of the County Committees named.

Their addresses are as follows :—

The Secretary, Co. Donegal Committee of Agriculture,
Courthouse, Lifford.

„ Co. Londonderry Committee of Agriculture,
Courthouse, Coleraine.

„ Co. Tyrone Committee of Agriculture,
Courthouse, Omagh.

The Scholarships will be awarded to eligible applicants, subject to the approval of the Department, in the order in which their applications for admission have been received.

Eligible applicants for whom no Scholarships are available may be admitted on payment of a fee of £2. Such applicants, if resident in County Donegal, Londonderry, or Tyrone, may, if they prefer, have their names retained on the list for consideration in connection with the award of scholarships for the next similar course.

A sum of £1 must be deposited by each student on entrance to cover the cost of repairs to clothes, the purchase of books, stationery, etc. The unexpended balance, if any, of this deposit will be refunded at the close of the course.

Each student must provide himself with a proper outfit, particulars of which will be forwarded to him with the notification of his admission.

Applications for admission should be made on the prescribed form not later than 14th January, 1914.

Forms of application may be obtained from the Secretaries of the County Committees of Agriculture mentioned above, or from the Secretary, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion Street, Dublin.

**DEPARTMENT OF AGRICULTURE AND TECHNICAL
INSTRUCTION FOR IRELAND.**

**ROYAL COLLEGE OF SCIENCE, DUBLIN,
SESSION 1914-15.**

**SCHOLARSHIPS IN AGRICULTURE, HORTICULTURE,
FORESTRY, AND CREAMERY MANAGEMENT.**

A limited number of scholarships will be offered in 1914 for competition among young men in Ireland who desire to acquire a thorough knowledge of Technical Agriculture, and, in addition, one or more scholarships will be provided for students who intend to specialise in either Horticulture, Forestry, or Creamery Management. Each scholarship includes—(1) free admission to the first year's course of instruction in the College, (2) one third-class railway fare to Dublin at the beginning of the session, and one third-class fare from Dublin at the end of the session, and (3) either of the following at the option of the Department—(a) a maintenance allowance of one guinea per week while in attendance at the Royal College of Science or elsewhere as the Department may decide; or (b) free board and residence at one of the Department's institutions; in the latter case a small grant will be made to each student towards the cost of books and apparatus.

A scholarship is tenable for one year, but selected candidates must undergo a probationary course of one term of about three months. If satisfactory progress be made by the holder, the scholarship may be renewed for a second, a third, and a fourth year, to enable the student to complete his course.

The Department do not undertake to employ, or find employment for, students at the close of the period of training.

Holders of these scholarships will be subject to the regulations made from time to time at the Royal College of Science, and will be required to devote their whole time to the course of study prescribed for them by the Department.

Candidates, who should be between 18 and 30 years of age on the 1st September, 1914, must make application on a form, which may be obtained from the Secretary, Department of Agriculture and Technical Instruction, Dublin, or the Registrar, Royal College of Science, Dublin, after the 1st February, 1914, and which should be returned not later than the 30th July, 1914.

Candidates must have been born in Ireland, or have been resident in Ireland for three years immediately prior to the 1st September, 1914.

Past and present students of the Royal College of Science for Ireland are ineligible as candidates.

The examination will take place in Dublin on the 12th, 13th, and 14th August, 1914. No expenses in connection with attendance at this examination will be allowed.

The subjects for the examination are :—

- (1) English.
- (2) *One* of the following : Latin, Irish, French, *or* German.
- (3) Mathematics.
- (4) Drawing.
- (5) *One* of the following :—Agriculture, Horticulture, Forestry, *or* Dairying and Creamery Management.

SYLLABUSES OF THE EXAMINATION.

A.—ENGLISH.

- (1) English Composition.
- (2) Literature :

Shakespeare : “ Merchant of Venice ” (School Edition).
(Philological questions will not be asked.)

Tennyson : “ Ulysses ” ; “ Tithonus ” ; “ Dream of Fair Women.”

Lowell : “ From My Study Windows—A Good Word for Winter.”

A knowledge of the metres of the various poems will be expected.
- (3) Outlines of History :

Europe, with special reference to Ireland, Great Britain, and France, A.D. 1603 to A.D. 1760.
- (4) Geography :
 - (a) Asia and Africa.
 - (b) The British Empire in Asia and Africa, in more detail.

B.—*One* of the following :—

LATIN.
IRISH.
FRENCH.
GERMAN.

The examination will include passages to be translated into English from the books prescribed, together with questions in grammar and colloquial phrases, and a passage to be translated from English into the language selected. The books prescribed are as follows :—

LATIN.

Virgil—"Æneid," Book I.

Cicero—Walford's Extracts from Part III., pages 223 to 251.

IRISH.

O'Leary—Séana, I.

MacRory—Lúb na Caillige agus ríéalta eile.

FRENCH.

Daudet—"Lettres de mon Moulin," viz., "Le secret de Maître Cornille"; "La chèvre de M. Seguin, Le Phare des Sanguinaires"; "L'Agonie de la Sémillante"; "Les Vieux."

Labiche et Martin—"Le Voyage de M. Perrichon."

Also a Modern Science Reader, the name of which can be obtained on application to the Registrar of the College.

GERMAN.

Muellenbach—"Johannissegn."

Uhland—"Siegfreids Schwert," "Des Knaben Berglied," "Schwäbische Kunde," "Klein Roland," "Roland Schildträger," "Taillefer," "Das Glück von Edenhall," "Des Sängers Fluch," "Der blinde König," "Einkehr," "Der gute Kamerad."

Also a Modern Science Reader, the name of which can be obtained on application to the Registrar of the College.

C.—MATHEMATICS.

The Syllabus in Mathematics will be the Pass Courses in Arithmetic, Geometry, Algebra and Trigonometry for the Middle Grade of the Intermediate Education Board's Examinations of 1914.

D.—DRAWING.

The Syllabus in Drawing will be the First and Second Years' Syllabuses of the Department's Programme for Day Secondary Schools.

E.—AGRICULTURE.

One of the following :—

AGRICULTURE.

HORTICULTURE.

FORESTRY.

DAIRYING AND CREAMERY MANAGEMENT.

Each applicant must have had substantial experience of practical work in connection with *either* farming, gardening, the management of woodlands, *or* dairying and creamery management. The examination may be written, oral, and practical. The subjects will include all the ordinary work of *either* farms, gardens, woods, *or* dairies as practised in Ireland. Under this head each applicant must present himself for examination only in the subject in which he desires a scholarship.

N.B.—On no account will a scholarship be awarded to a candidate who fails to attain a high standard in the subject he selects for this portion of the examination ; while excellence in that subject will be taken into consideration in case of deficiency in one or more of the others.

Marks will also be awarded on the ability of candidates to impart instruction as gauged by the style of the answers in both the written and the oral examinations.

Candidates who are qualified for scholarships by their examination on the foregoing subjects will be required to submit to an examination by a medical officer appointed by the Department. A scholarship will not be awarded in any case where the candidate is certified to be unfit to undertake the prescribed course of studies.

**LAST DATE FOR RECEIVING APPLICATIONS,
30th JULY, 1914.**

DEPARTMENT OF AGRICULTURE AND
TECHNICAL INSTRUCTION FOR IRELAND,
UPPER MERRION STREET,
DUBLIN, *January, 1914.*

No. A. 26189-13.

GENTLEMEN,

The Department consider it opportune at the present time to direct the attention of vendors of agricultural seeds to the very important agreement which was entered into by the principal firms of seed cleaners respecting the standard of ryegrass seed to be offered by them for sale in future in Ireland. The agreement in question was embodied in the following resolution adopted unanimously at a meeting of the seed cleaners, held in Belfast on 25th July last :—

“That we, seed cleaners and merchants, hereby agree, as testified by our signatures hereto, not to sell from this date for use as agricultural seeds in Ireland any white hay, brown hay, cleanings, blowings, holcus (or articles of similar description), or perennial ryegrass under 20 lb. weight per bushel, or Italian ryegrass under 16 lb. weight per bushel.”

The list of signatories comprises those firms from which the great bulk of the ryegrass seed sold in Ireland is procured directly or indirectly by local wholesale merchants and retailers.

The seed cleaners, by their action above referred to, have made a great advance towards that improvement in the standard of agricultural seeds which is so essential to the progress of agriculture in many parts of Ireland. The Department, and indeed the whole country, now look to wholesale and retail merchants to follow the example set by the seed cleaners and to abandon altogether the practice of ordering inferior seeds. It must be admitted that the standard specified in the Belfast resolution is not a high one, and that anyone selling seeds below that standard is guilty of a grave offence against the interests of Irish agriculture.

The Department recognise that at present in many cases merchants do not sell the inferior qualities complained of, but they are also aware that too large a number of retailers do so. They believe that the action of the seed cleaners will be an encouragement to those merchants who hitherto have dealt in high-class seed only. They also feel that the elimination of the main source of supply of inferior seeds should remove the fear of losing customers, which has hitherto deterred merchants from abandoning a class of trade which is really neither conducive to the interests of their customers nor to their own reputation as vendors of agricultural seeds.

I am,

Gentlemen,

Your obedient Servant,

T. P. GILL,

Secretary;

To Vendors of Agricultural Seeds
in Ireland.

DEPARTMENT OF AGRICULTURE AND TECHNICAL INSTRUCTION FOR IRELAND.

Fertilisers and Feeding Stuffs Act, 1906.

SALE AS FEEDING STUFFS OF ARTIFICIALLY PREPARED PRODUCTS OF MAIZE.

The practice of extracting oil from the germ of maize and utilising the germ from which the oil is extracted in the manufacture of feeding stuffs is extending in Ireland. The Department, accordingly, desire to draw the attention of Irish Millers to Section I. (2) of the Fertilisers and Feeding Stuffs Act, 1906, which provides as follows :—

“Every person who sells for use as food for cattle or poultry any article which has been artificially prepared, shall give to the purchaser an invoice stating the name of the article, and whether it has been prepared from one substance of seed or from more than one substance or seed, and in the case of any article artificially prepared otherwise than by being mixed, broken, ground, or chopped, what are the respective percentages (if any) of oil and albuminoids contained in the article, and the invoice shall have effect as a warranty by the seller as to the facts so stated, except that as respects percentages the invoice shall have effect as a warranty only that the actual percentages do not differ from those stated in the invoice beyond the prescribed limits of error.”

In this connection the Department consider it desirable to point out that any feeding stuff which contains or consists of maize germ from which oil has been artificially extracted, comes within the scope of the foregoing Section, and that every person selling any of these products as food for cattle or poultry, is consequently obliged by law to give the purchaser an invoice showing the percentages of oil and albuminoids contained therein.

Farmers and others purchasing these products should therefore insist upon obtaining from the vendors the analysis prescribed by law.

DEPARTMENT OF AGRICULTURE AND TECHNICAL INSTRUCTION FOR IRELAND.

CELERY LEAF-SPOT DISEASE.

MEMORANDUM.

The Department desire to bring under the notice of seedsmen the prevalence of Celery Leaf-spot disease (*Septoria petroselinii*) in Ireland, and the extent to which the disease has increased in recent years.

It is not, perhaps, generally realised that the disease is readily conveyed through infected seed. The Department are of opinion that it is by this means that the disease is most commonly introduced. This view is strengthened by the fact that of nine samples of seed recently examined, seven were found to be carrying the spores of the disease.

The Department feel that when seedsmen realise the danger of selling infected seed, and thus spreading the disease broadcast throughout the country, they will use every effort to procure clean seed and thus protect the interests of themselves and their customers alike.

A leaflet concerning Celery Leaf-spot disease is at present in course of preparation, and a recommendation will be made therein to growers to insist upon obtaining a guarantee that any celery seed they purchase is free from this disease.

The Department are prepared to examine samples of celery seed for seedsmen, and to report as to whether the disease is present. The fee charged for the examination of such samples will be 1s. each.

ORDER

OF THE DEPARTMENT OF AGRICULTURE AND TECHNICAL INSTRUCTION FOR IRELAND.

(Dated 24th December, 1913.)

BLACK SCAB IN POTATOES (SPECIAL AREA, IRELAND) ORDER, 1913.

The Department of Agriculture and Technical Instruction for Ireland, by virtue and in exercise of the powers vested in them under the Destructive Insects and Pests Acts, 1877 and 1907, do order, and it is hereby ordered as follows:—

Restriction of movement of potatoes out of Scheduled District.

1. Excepting potatoes shipped from Annalong, Kilkeel, Greencastle and Rostrevor, potatoes shall not be moved out of the district described in the First Schedule to this Order (hereinafter referred to as the scheduled district) otherwise than under and subject to the conditions of a licence authorising such movement.

Certificates ; production of certificates ; names and addresses.

2. (1) Potatoes shall not be loaded on any vessel at, or be moved from, the ports of Annalong, Kilkeel, Greencastle or Rostrevor, unless the person causing, directing or permitting the potatoes to be so loaded, or the person causing, directing or permitting the potatoes to be so moved shall have obtained a certificate in the prescribed form stating that the potatoes are free from the disease known as Black Scab, Wart or Warty Disease, Cauliflower Disease, Potato Canker, or Potato Rosette (and caused by the fungus known as *Chrysophlyctis endobiotica* [Schilb] or *Synchytrium endobioticum* [Perc]).

(2) Any person causing, directing or permitting potatoes to be loaded as aforesaid shall, on demand of a Justice or of a constable

or of an inspector or of any authorised officer, or of the master of any vessel on which potatoes have been or are about to be loaded, produce and show to him the aforesaid certificate and shall allow it to be read and a copy of, or extract from, it to be taken by the person to whom it is produced.

(3) Any person in charge or in possession of potatoes loaded or in the course of being loaded on any vessel at the aforesaid ports in contravention of this Order, or of any potatoes moved in contravention of this Order shall, on demand of a Justice or of a constable or of an inspector or of any authorised officer, give his name and address and all the information in his possession as to the person causing, directing or permitting the potatoes to be so loaded or moved.

Restriction on planting, digging and moving potatoes within prohibited areas.

3. Within the areas described in the Second Schedule to this Order (hereinafter referred to as the prohibited areas) potatoes shall not be planted, dug, or otherwise raised out of the ground, or moved from any field, plot, pit, shed, outhouse or other place on or used in connection with any farm, garden or agricultural holding otherwise than under and in accordance with the conditions of a licence authorising the planting, digging or raising out of the ground, or movement of the said potatoes.

Restriction on planting of potatoes within Scheduled District.

4. Potatoes shall not be planted on any land on which potatoes have previously been grown outside the prohibited areas but otherwise within the scheduled district unless a period of at least five years shall have elapsed since potatoes were previously planted on the said land or until a licence authorising the planting of potatoes on the said land has been obtained by the occupier of the said land; in the latter case potatoes shall not be planted except in accordance with the conditions, if any, specified in the said licence.

Prohibition of use for seed purposes of potatoes grown within prohibited areas or scheduled districts.

5. (1) Potatoes grown within the prohibited areas shall not be supplied or used for planting.

(2) Potatoes grown outside the prohibited areas but otherwise within the scheduled district shall not be supplied or used for planting elsewhere than in that district.

Prohibition of movement of potato stalks, etc., grown within prohibited areas.

6. Potato stalks and leaves or portions thereof grown within the prohibited areas shall not be moved out of the field, plot, or other place on which they have been grown, but shall be destroyed by burning or shall be ploughed into the land by the occupier of the said field, plot, or other place within such period as may be notified in writing to the occupier by an inspector or by any authorised officer.

Restriction on use of potatoes within prohibited areas.

7. Within the prohibited areas uncooked potatoes or portions thereof shall not be used either alone or mixed with other materials

as food for stock or poultry, or be spread on the land or put into or upon any manure heap.

Production of licences ; names and addresses.

8. (1) Any person in charge or possession of potatoes which are being moved, where, under this Order, a licence is necessary shall, on demand of a Justice or of a constable or of an inspector or of any authorised officer, produce and show him the licence and shall allow it to be read and a copy of, or extract from, it to be taken by the person to whom it is produced.

(2) Any person in charge or possession of potatoes suspected by a Justice or by a constable or by an inspector or by any authorised officer of being or having been moved without a licence in contravention of this Order shall, on demand as aforesaid, give his name and address and all the information in his possession as to the persons in whose charge or possession the potatoes have been and as to the place where the potatoes were grown or loaded.

Special licences.

9. Notwithstanding anything in this Order contained, any potatoes, potato peelings, potato stalks, potato leaves or portions thereof may be moved or used in any manner specified in any licence granted by an inspector or by any authorised officer.

Powers of Entry and Inspection.

10. An inspector or any authorised officer, upon production, if so required, of his appointment or authority, may, for the purpose of enforcing this Order, enter any premises, or any ship, boat, or other vessel or craft, and examine and take samples of any potatoes therein.

Licences and certificates.

11. (1) Licences and certificates under this Order may be granted by an inspector or by any authorised officer.

(2) Every licence and certificate issued under this Order shall be delivered up to the Department in the manner prescribed on said licence or certificate as soon as the purpose for which it is issued has been carried out or the time for which it is valid has elapsed.

(3) Any erasure or alteration made in a licence or certificate shall render it invalid.

Offences and Penalties.

12. If any person—

(a) moves any potatoes, potato peelings, potato stalks, potato leaves, or portions thereof ; or causes, directs or permits the same to be moved, in contravention of this Order or in contravention of the conditions inserted in any licence thereunder :

(b) loads any potatoes, potato peelings, potato stalks, potato leaves, or portion thereof, on any ship, boat or other vessel or craft ; or causes, directs or permits the same to be so loaded, in contravention to this Order, or in contravention of the conditions inserted in any licence thereunder :

- (c) plants any potatoes or digs or raises any potatoes out of the ground ; or causes, directs or permits the same to be planted, dug, or raised, in contravention of this Order or in contravention of the conditions inserted in any licence thereunder :
 - (d) uses as food for stock or poultry, or as manure, or puts into any manure heap, or spreads on any land any potatoes, potato peelings, potato stalks, potato leaves, or portions thereof ; or causes, directs or permits the same to be used as food for stock or poultry, or as manure, or to be put into any manure heap or spread on any land, in contravention of this Order or in contravention of the conditions inserted in any licence thereunder :
 - (e) refuses or neglects to destroy any potato stalks, potato leaves, or portions thereof, either by burning or by digging or ploughing the same into the land ; or causes, directs or permits the same to remain undestroyed as aforesaid in contravention of this Order :
 - (f) refuses or neglects to produce and show any licence or certificate or refuses to allow it to be read and a copy of, or extract from, it to be taken as required by this Order when called upon to do so by any of the persons set out in Articles 2 (2) and 8 (1) of this Order :
 - (g) refuses or neglects to give his true name and address, or give a false name or address to any of the persons set out in Articles 2 (3) and 8 (2) of this Order :
 - (h) refuses or neglects to give to any of the persons set out in Articles 2 (3) and 8 (2) of this Order, or to the Department when required to do so, the information required by said Articles :
 - (i) obstructs or impedes any inspector or any authorised officer in discharge of his duty under this Order :
 - (j) refuses or neglects to deliver up any licence or certificate in contravention of Article 11 of this Order,
- he shall be liable on conviction to a penalty not exceeding ten pounds for each offence.

Execution of the Order.

13. For the purposes of this Order a notice shall be deemed to be served on a person if it is delivered to him personally, or left for him at his last known place of abode, or at his office or place of business, or sent through the post in a letter addressed to him at either of such addresses, and a notice or other document purporting to be signed by an inspector or any authorised officer shall be *prima facie* evidence that it was signed by such inspector or such authorised officer as the case may be and duly authorised.

Definitions.

14. In this Order—

“The Department” means the Department of Agriculture and Technical Instruction for Ireland.

“Inspector” means an Inspector of the Department.

“Authorised officer” means any person authorised by the Department.

"Premises" means land, or a building or buildings, or land within a building or buildings thereon.

"Occupier" means any person using land for the purpose of growing potatoes thereon, whether he has an estate in said lands or not.

"Prescribed" means prescribed by the Department.

Commencement.

15. This Order shall come into operation on the Twenty-fourth day of December, Nineteen Hundred and Thirteen.

Short Title.

16. This Order shall be cited as the Black Scab in Potatoes (Special Area, Ireland) Order, 1913.

IN WITNESS whereof the Department of Agriculture and Technical Instruction for Ireland have hereunto set their Official Seal this Twenty-fourth day of December, Nineteen Hundred and Thirteen.

(L.S.)

J. D. DALY,
on behalf of the Secretary.

FIRST SCHEDULE.

SCHEDULED DISTRICT.

A District comprising:—

The townlands of Ballincurry, Ballindoalty, Ballyedmond, Ballyneddan, Ballinran, Ballintur, Kilfeaghan, Kilfeaghan Upper, and Tamnyveagh, all in the Barony of Iveagh Upper, Upper Half, in the Administrative County of Down; and the townlands of Aghyoghill, Attical, Aughnahoory, Aughnaloopy, Aughrim, Mourne Mountains West, Lisnacree Upper, Lisnacree, Ballymadeerfy, Glenloughan, Glenloughan Upper, Tullyframe, Maghery, Drummanlane, Ballygowan, Benagh Upper, Benagh Lower, Greencastle, Cranfield, Grange, Lurganconary, Lurganreagh, Drummamore, Corcreaghan, Ballymagart, Mourne Park or Ballyrogan, Ballymageogh, Mourne Mountains Middle, Drumindoney, Ballyardel, Ballynahatten, Dunnaval, Derryoge, Dunnaman, Drumero, Leitrim, Leitrim Upper, Ballinran Upper, Ballinran, Kilkeel including Kilkeel town, Magheramurphy, Magheragh, Ballykeel, Carrigenagh, Carrigenagh Upper, Brackenagh West Upper, Brackenagh West, Brackenagh East Upper, Brackenagh East, Ballymartin, Ballyveagh Beg, Ballyveagh Beg Upper, Ballyveagh More, Balleyveagh More Upper, Moneydorrugh More Upper, Moneydorrugh More, including the town of Annalong, Moneydorrugh Beg, Mullartown, Glasdrumman, Ballagh-anarey, Ballaghanery Upper, Guineways, Guineways Upper, Moyad Upper, Moyad, all in the Barony of Mourne in the Administrative County of Down; and the Rostrevor Quay and the direct road leading thereto from the townland of Ballinran in the Barony of Iveagh Upper, Upper Half, in the Administrative County of Down.

SECOND SCHEDULE.

PROHIBITED AREAS.

1. A District comprising :—

Such parts of the Administrative County of Down as lie within the following boundary (the roads mentioned as forming the boundary being regarded as outside the prohibited area) :—

Commencing at the point (near Mr. O'Hagan's farm) on the coast where the boundary between the Townlands of Ballynahatten and Cranfield in the Barony of Mourne begins, thence by the aforesaid boundary to the point where it meets the main road near Mourne Wood demesne, thence by the direct road passing Mourne Wood gate lodge to Mallyardel cross roads, thence by the direct road *via* Belhill to Newry main road, thence by the direct road to Mr. Doran's shop, thence by the direct road *via* Massfort Chapel to Hilltown Mountain road, thence by the direct road to the point where it meets the townland boundary between Kilkeel and Aughnaloopy townlands, thence by the townland boundary *via* Pookey bridge to the Kilkeel river, thence by the Kilkeel river to the Newcastle road bridge at Riverside, thence by direct road to Mullagh bridge, thence by the Mullagh river to Brackenagh bridge, thence by the direct road to Ballyveagh Beg main road, thence by Ballyveagh Beg main road to Brackenagh cross road, thence by the direct road over ford and townland boundary to Ballyveagh cross roads (near Ballyveagh school), thence by Longstone road, passing Moneydorrugh school, to Mr. McKibbin's house, thence by Moneydorrugh Beg road (known also as Rockey Hill road), passing Mr. Stewart's shop, to Newcastle road, thence by the direct road to Moneydorrugh Beg Shore road, thence by Moneydorrugh Beg Shore road to the point where it reaches the seashore, thence directly by the seashore to the point on the coast near Mr. O'Hagan's farm where the boundary between Ballynahatten and Cranfield townlands, in the Barony of Mourne, begins.

2. A District comprising :—

Such parts of the Administrative County of Down as lie within the following boundary (the roads mentioned as forming the boundary being regarded as outside the prohibited area) :—

Commencing at the point on the coast in the townland of Benagh Upper, in the Barony of Mourne, where the White Water river enters Millbay, thence by the White Water river to White Water bridge, thence by the direct road (which crosses the road leading from Grange School to Greencastle Post Office), passing Mr. Gordon's farm, to the seashore at Cranfield Bay, thence by the seashore *via* Greencastle Point to the point on the coast in the townland of Benagh Upper, in the Barony of Mourne, where the White Water river enters Millbay.

II.—TECHNICAL INSTRUCTION.

FORM S. 31.

DEPARTMENT OF AGRICULTURE AND
TECHNICAL INSTRUCTION FOR IRELAND,
UPPER MERRION STREET, DUBLIN.

SPECIAL EXAMINATION FOR TEACHERS' QUALIFICATIONS IN MANUAL TRAINING (WOODWORK), 1914.

A Special Examination for Teachers' qualifications in Manual Training (Woodwork) will be held in Dublin, on Tuesday and Wednesday, 16th and 17th June, 1914. The subjects and Time Table of the examination will be :—

<i>Tuesday, June 16th</i>	. 10 a.m. to 1.30 p.m.	. Drawing.
" "	. 2.15 to 5.15 p.m.	. Theory.
<i>Wednesday, June 17th</i>	. 9.30 a.m. to 1 p.m.	. Drawing on the Blackboard and Demonstration Exercises.
" "	. 2 to 5 p.m.	. Practical Woodwork Test.

For Syllabuses of the subjects of examination see Circular
Letter No. 24.

Tools, wood, drawing boards (imperial size), paper, pens and ink will be provided by the Department, but candidates will be required to bring mathematical instruments, pencils, erasers, etc., for the examination in Drawing; and, although tools for the Practical Woodwork Test will be provided by the Department, candidates are advised to bring their own, as no allowance can be made should the candidate not consider the tools supplied as satisfactory.

Applicants for admission to the examination must be twenty-one years of age on or before the 1st January preceding the examination.

Application for admission to the examination must be made, on Form S. 32, not later than the 30th April, and must be accompanied by the examination fee of 10s.

FORM S. 108.

DEPARTMENT OF AGRICULTURE AND
TECHNICAL INSTRUCTION FOR IRELAND,
UPPER MERRION STREET, DUBLIN.

I.—SPECIAL EXAMINATIONS FOR TEACHERS' QUALIFICATIONS IN EXPERIMENTAL SCIENCE AND DOMESTIC ECONOMY.

The Department will hold, in 1914, Special Examinations for Teachers' Qualifications in Experimental Science and Domestic

Economy. Each examination will be divided into two portions, the first a written test to be held on Saturday, the 25th April, from 11 a.m. to 2 p.m.; and the second a practical test to be held subsequently on a date to be fixed by the Department, and which will be duly notified to candidates. Provisional recognition to give instruction will be granted to those candidates who pass the examination.

If a sufficient number of approved applications are received, examinations will be held in each of the following subjects :—

- (1) First Year Syllabus of the Preliminary Course.
- (2) Second Year Syllabus of the Preliminary Course.
- (3) Physics (Third Year Syllabus—General Physics and Heat).
- (4) Physics (Fourth Year Syllabus—Course A).
- (5) Physics (Fourth Year Syllabus—Course B).
- (6) Chemistry (Third Year Syllabus).
- (7) Chemistry (Fourth Year Syllabus).
- (8) Mechanics (Third Year Syllabus).
- (9) Mechanics (Fourth Year Syllabus).
- (10) Botany (Third Year Syllabus).
- (11) Botany (Fourth Year Syllabus).
- (12) Physiology and Hygiene (Third Year Syllabus).
- (13) Physiology and Hygiene (Fourth Year Syllabus).
- (14) Physical and Commerical Geography (Third Year Syllabus).
- (15) Physical and Commerical Geography (Fourth Year Syllabus).
- (16) Domestic Economy (First Year Training Course).
- (17) Domestic Economy (Second Year Training Course).
- (18) Domestic Economy (Third Year Training Course).

The examination in any subject will be open only to those Teachers in Secondary Schools who have received at least 100 hours' practical instruction in that subject within two calendar years previous to the date of the present examination. Before entering on the course of instruction each Teacher must obtain, in writing, the Department's approval of the conditions under which such instruction is to be secured.

Teachers who have made regular attendance at the Summer Courses of Instruction conducted by the Department in 1912 and 1913, and who, as a result of the examinations at the conclusion thereof, failed to secure a certificate, will be admitted to the Special Examination in that subject without having to satisfy the Department as to attendance at further courses of instruction.

Candidates will not be permitted to sit for examination in more than one subject.

Should a sufficient number of applications for examination be received the Department will arrange to hold the written examination at Dublin, Belfast, Cork, Londonderry, Limerick, Waterford and Galway. In very exceptional circumstances other centres might be arranged for, provided that special written application is made by School Managers before the 28th February, 1914.

Application for admission to the examination must be made before the 28th February, 1914, on Form S. 118, copies of which may be obtained, after the 1st January, upon application to the offices of the Department.

II.—REGULATIONS UNDER WHICH THE DEPARTMENT ARE PREPARED TO RECOGNISE SPECIAL COURSES IN EXPERIMENTAL SCIENCE AND DOMESTIC ECONOMY FOR TEACHERS IN DAY SECONDARY SCHOOLS.

The Instructors in charge of classes for Teachers must be specially qualified, and their qualifications must be approved of by the Department for the purposes of the Special Course of Instruction.

The Laboratories and Domestic Economy Rooms must also be approved of by the Department for the purposes of the Special Courses of instruction.

Special classes, conducted during the winter in a Technical School or central institution, other than Training Colleges, may earn grants according to the regulations and scale of payment set out in Section III. of the Programme for Technical Schools and Classes.

Attendance at theoretical instruction may not be taken into account when computing the 100 hours' practical instruction referred to in the third paragraph of Section I of this form.

Application for the recognition of special classes for Teachers *must be made by letter*, accompanied by detailed proposals upon Form S. 54. Attendance at lessons previous to the receipt of the Department's written approval of the arrangements may not be reckoned as part of the 100 hours' practical instruction.

FORM S. 125.

DEPARTMENT OF AGRICULTURE AND
TECHNICAL INSTRUCTION FOR IRELAND,
UPPER MERRION STREET, DUBLIN.

TECHNICAL SCHOOL EXAMINATIONS, 1914.

GENERAL REGULATIONS GOVERNING THE CONDUCT OF THE EXAMINATIONS.

(1) The Department's Scheme of Technical School Examinations is designed to follow courses of instruction extending over four years in the following branches of technical knowledge :—

Commerce.
Building Trades.
Applied Chemistry.
Electrical Engineering.
Mechanical Engineering.
Domestic Economy.
Art.

There will be, in general, two examinations in each Course in each of the four years, and the examinations in each Course must be taken in the order prescribed. The Department will not concern themselves with the examination of candidates other than those intending to take out a Course Certificate, except in the case of candidates who wish to obtain one of the Certificates for Teachers of Drawing and Art referred to in Form S. 240.

(2) Only the examinations in the subjects of the First, Second,

and Third Years of each Course, will be held in 1914. Candidates will, for the present, be allowed to take the first and Second Year Examinations in the same year; candidates who obtained a success in any one subject of the Second Year of a Course (except an Art Course) in 1913 may take the remaining subject of that Year in 1914 together with the examinations of the Third Year; candidates for the Third Year Examinations of the Courses in Art must have passed in 1913 in at least two subjects of the Second Year; but it must be understood that no candidate can obtain credit for the examinations of any Year unless he shall have passed all the preceding examinations in the Course. Candidates who did not obtain a success in any subject of the Second Year of a Course in 1913 are not eligible for admission to the examinations of the Third Year of the Course in 1914.

(3) The Examinations will be held in May. The dates on which the Examinations in the various subjects will be held are specified in the Examination Time Table, published separately. The Department do not undertake to make any arrangements for the examination of candidates taking the Grade I. Examination in Telegraphy or in Telephony of the City and Guilds of London Institute, in connection with the Third Year Examinations in Courses B and C of Electrical Engineering. Such arrangements must be made by the candidates with the Institute through the Managers of an Examination Centre.

(4) The Syllabuses of the subjects are set out in the Programme of Technical Schools Examinations (price 2*d.*, postage extra). Copies of the Examination Papers set in 1913 and of the Examiners' Reports have been published in book form. These publications may be obtained directly, or through any bookseller, from E. Ponsonby, Limited, 116 Grafton Street, Dublin.

(5) Certificates will not be issued by the Department in respect of the First and Second Year Examinations of any Course. Pass Lists will, however, be issued to the local School Authorities. A "Provisional Certificate" will be issued on the passing of the Third Year Examinations (candidates having already passed in the examinations prescribed for the First and Second Years), and a "Full Course Certificate" on the passing of the Fourth Year Examinations, the latter to have stated upon it the subjects taken in the Course and the Class of success (First or Second) obtained. It is further proposed to issue a "Full Course Honours Certificate" to candidates who pass the further examinations specified in certain Courses.

(6) It is intended that the courses of instruction of which these examinations will provide a test, should include not only theoretical but practical and laboratory work. In the examination in Chemical Analysis credit will be given for records of work done by candidates, and their laboratory note-books, signed and certified by the teacher, must be retained and made available for examination.

In addition to the theoretical examinations in the Syllabuses prescribed in certain Science subjects (see Programme), candidates may be required to furnish evidence that they have followed a satisfactory course of practical work. Laboratory note-books will be regarded as evidence of this, and Local Examination Secretaries will be required to furnish to the Department, not later than the 28th February, a list of the candidates proposing to take the following examinations:—

COURSES IN APPLIED CHEMISTRY.

- First Year : Elementary Physics.
- First Year : Elementary Chemistry.
- Second Year : Inorganic Chemistry.
- Third Year : Inorganic and Organic Chemistry.

COURSES IN ELECTRICAL ENGINEERING.

- First Year : Electrical Engineering.
- Second Year : Electrical Engineering.
- Third Year : Electrical Engineering.
- Third Year : Electrical Testing (Courses B and C).

(7) The practical tests in Chemical Analysis of the Second and Third Years' Examinations in Applied Chemistry can only be held in Laboratories specially approved by the Department for the purpose. Schools, will, subject to these regulations, be constituted centres for the practical examinations of the Third Year of the Courses in Mechanical Engineering (Course B) and Domestic Economy, only on the understanding that the Managers are prepared to make such special arrangements as will be necessary for these examinations.

APPLICATION FOR EXAMINATION PAPERS.

(8) Managers who wish their Schools to be made Examination Centres must make application for Examination Papers, on Form S. 102, not later than the 18th March. On this Form the Managers will also be required to propose arrangements for the examinations.

FEES FOR EXAMINATION PAPERS.

(9) An examination fee of 1s. 6d. will be payable by candidates for each subject of examination prescribed when held by the Department. When the examinations of the City and Guilds of London Institute are prescribed the fee chargeable by that body will be payable by the candidates.

(10) The remittance of the fee for examination papers must be made by Bank Draft, Cheque, or Postal Order, payable to "The Accountant, Department of Agriculture and Technical Instruction for Ireland." *Stamps cannot be accepted.*

ADMISSION OF EXTERNAL CANDIDATES.

(11) External candidates (i.e., candidates who are not students of a School which is to be an examination centre) must apply not later than 10th March to the Managers of the School where examinations in the subjects required will be held.

FEES FOR EXTERNAL CANDIDATES.

(12) Managers may charge external candidates a fee not exceeding 2s. 6d. for each morning, afternoon, or evening for which they register their names for examination. The admission of external candidates to examinations in Chemical Analysis, Engineering Workshop Practice, Domestic Economy (Practical Tests), and Modelling, is not obligatory, and the above-mentioned limitation to the fee will not apply in the case of admission to the examinations in these subjects. These fees are additional to the fees payable to the Department.

LATE APPLICATION FOR PAPERS.

(13) The Department will accept late applications for papers up to the 31st March, but applications for Examination Centres cannot be accepted after the 18th March.

CANDIDATES ELIGIBLE FOR EXAMINATION.

(14) Though the Examinations are based upon the knowledge which may be acquired in following a definite course of instruction in a Technical School, the Department will not, for the present, require attendance at a Technical School as a qualification for admission to these examinations. There are no limits of age for applicants for examination papers.

CONJOINT EXAMINATIONS OF TWO OR MORE SCHOOLS.

(15) Where Managers of different Institutions have classes in the same subject under their control they must arrange, where possible, for a conjoint examination of these classes in such a manner that an unnecessary number of rooms may not be in use.

SEPARATE EXAMINATIONS NOT HELD FOR LESS THAN FOUR CANDIDATES.

(16) A separate examination will not, as a rule, be held where the number of candidates to be presented in any one subject is less than four, but the Department will be prepared, in exceptional circumstances, to approve of examinations being held for a fewer number of candidates, if special written application, setting forth the circumstances, is made not later than the 28th February.

SEATING ARRANGEMENTS.

(17) The accommodation provided must be sufficient to permit of the candidates being so seated that no candidate may be able to overlook the work of another candidate in the same subject, and that candidates may not be able to afford assistance to one another. With the exception of the examinations in Object and Memory Drawing, Drawing from Casts and Drawing from Natural Forms, the candidates must be seated not less than five feet apart. At the examinations in these Art Subjects candidates may be placed so as to be not less than two feet six inches apart. It is desirable that rooms with level floors and without galleries should be used.

SUPPLY OF EXAMINATION REQUISITES.

(18) Managers or their representatives must provide (for use in the examination in those subjects in which they are respectively required) ink, pens, ruled foolscap paper, paper fasteners, tracing paper, and the necessary materials required for examinations in certain Art Subjects such as, e.g., stands, nails, etc., for hanging up casts; clay and plaster for modelling, etc. They may also be required to provide the materials necessary for the examinations in Engineering Workshop Practice and the practical tests in Domestic Economy.

DESPATCH OF EXAMINATION PAPERS AND OF EXAMINATION MATERIALS.

(19) The examination papers and the materials supplied by the Department for the examinations, will, as a rule, be forwarded

to the Examination Secretary, but if the Examination Secretary is ineligible to act as Superintendent (see Section 21 below), the Managers must appoint some other responsible person to act as Custodian of Examination Papers.

(20) The packets of examination papers must not, under any circumstances, be permitted to pass into the hands of a teacher, of a candidate for examination, or of any other person interested in the success of the candidates.

NOMINATION OF SUPERINTENDENTS.

(21) The Managers will nominate, on Form S. 107, certain persons prepared to superintend the examinations. The Superintendents may either be voluntary Superintendents, or they may be remunerated by the Managers, after notice to the Department, at a rate not exceeding 2s. 6d. per hour of attendance necessary; the Department would not, however, approve of Managers making payments for such services to members of their own body. Candidates for examination, their relatives, their teachers, or other persons who have a direct interest in the success of any candidate are ineligible to act as Superintendents of Examinations. Managers are held entirely responsible for the presence of Superintendents to the number required at each examination; otherwise the examination may be held to be void. Copies of Form S. 107 will be issued in due course to the Managers of all Centres whose applications (on Form S. 102) for examination papers have been accepted.

DETAILED INSTRUCTIONS SENT TO SECRETARY.

(22) Detailed Instructions for the conduct of the examinations will be addressed in due course to the Examination Secretary.

CARDS OF ADMISSION TO EXAMINATIONS.

(23) The Department do not propose to issue cards of admission for the use of candidates, but it is desirable that such cards should be prepared and issued by the Managers of the Examination Centres.

PENALTIES FOR INFRINGEMENT OF REGULATIONS.

(24) The Department may disallow examinations which afford evidence of not having been conducted in strict accordance with the Regulations; they will investigate cases of suspected irregularity and may require any or all of the candidates to be re-examined. If any candidate should fail to appear at such investigation, or decline to be re-examined, all his previous examinations may be cancelled. When an examination has failed through no fault of the candidates, a re-examination may be allowed, the cost of which may be charged to the Managers. A re-examination will not be accepted for the purposes of Scholarships, etc.

DEPARTMENT NOT RESPONSIBLE FOR ERRORS.

(25) All possible care is taken that the examination papers may be forwarded in accordance with the applications, and that the results may be issued correctly, but the Department cannot undertake to rectify mistakes, nor will they be responsible for any incidental loss.

SPECIAL EXAMINATIONS FOR ART TEACHING CERTIFICATES.

(26) Special Examinations in Geometrical Drawing and Methods

of Teaching Drawing, in connection with the award of Teachers' Certificates in Art under the conditions of Form S. 240, will be held in May. The regulations governing the conduct of these examinations will, in general, be as set forth above.

FORM S. 235.

DEPARTMENT OF AGRICULTURE AND
TECHNICAL INSTRUCTION FOR IRELAND,
UPPER MERRION STREET, DUBLIN.

SPECIAL EXAMINATIONS IN FREEHAND DRAWING,
MODEL DRAWING, DRAWING IN LIGHT AND SHADE
FROM A CAST, AND ELEMENTARY DESIGN.

In accordance with the terms of Circular 84, the Department are arranging to hold, in February, 1914, Special Examinations in the subjects mentioned above, to enable candidates who have already obtained not less than three successes towards the Irish Secondary Teachers' Drawing Certificate to complete the requirements therefor.

The Time Table of the Examinations will be :—

<i>Friday, 20th February</i>	. 1 to 5 p.m.	. Elementary Design.
<i>Do.</i>	. 6 to 9 p.m.	. Drawing in Light and Shade from a Cast.
<i>Saturday, 21st February</i>	10 a.m. to 12.30 p.m.	Model Drawing.
<i>Do.</i>	. 1.30 to 4 p.m.	. Freehand Drawing.

These examinations will be held at any centre, being a School recognised under the Department's Programme for Day Secondary Schools or the Programme for Technical Schools and Classes, at which there will be at least four candidates for each examination for which application is made. Arrangements will also be made for these examinations to be held at the Metropolitan School of Art, Dublin, and candidates will be accommodated at this centre free of charge. Candidates attending other centres may be required to pay a fee to the School authorities for the accommodation provided.

Applications for admission to the examinations must be made upon Form S. 236, not later than the 1st February, and should be submitted through the Managers of the School at which the candidate proposes to sit. If a candidate has been unable to make arrangements for his accommodation at any centre, the form of application should be returned direct to the Department not later than the date mentioned. The Department will then furnish the candidate with a list of the centres at which examinations are to be held.

FORM S. 255.

DEPARTMENT OF AGRICULTURE AND
TECHNICAL INSTRUCTION FOR IRELAND,
UPPER MERRION STREET, DUBLIN.

**EXAMINATION IN THE PRINCIPLES, METHODS, AND
HISTORY OF EDUCATION, 1914.**

An examination in the Principles, Methods, and History of Education, with special reference to Science Teaching, will be held on Saturday, the 27th June, 1914. The examination will be held in Dublin, and also, if a sufficient number of applications are received, in Belfast and Cork.

The test in this subject is provided for persons who have been provisionally recognised as Teachers of Experimental Science under the conditions of §§ I. (1) and II. (1) of the Department's Circular Letter (No. 23) of May, 1903, and the Department will not be prepared to admit applicants who are not qualified for such provisional recognition.

Applications for admission to the examination should be submitted not later than the 30th May, on Form S. 250, copies of which may be obtained after the 1st February from the offices of the Department.

A fee will not be charged for admission to the examination.

SYLLABUS OF EXAMINATION.

The history and criticism of opinion upon the Ends of Education and of the Curriculum as the means of attaining those ends, with special reference to the development and present state of instruction in Science.

The Endowment of the child as the basis of the educational process. The relation of Development to Endowment.

The main features of general development; the inter-relation of the Intellectual, Emotional and Active factors.

The chief states in general development: their characteristics and normal order of appearance.

The most important differences between individual children with regard to the foregoing.

The general characteristics of the Curriculum and Methods of instruction in Science as determined by the laws of general development: the correlation of Science with other subjects of the curriculum.

The nature and relations of the mental functions involved in the acquisition of Knowledge. Individual differences with regard to these, especially in the characteristics of Attention and Imagery. The main principles of Exposition.

The general nature of the Inductive and Deductive processes: their relations to one another in the development of knowledge: their characteristics at different stages of general development.

The methodology of instruction in Science as determined by the laws of development of Knowledge: the functions and relations of laboratory work and class teaching.

The critical study of the history of a special branch of Science so far as it bears upon the teaching of the subject.

The general principles of Class-management: Order and Discipline: class-management in the laboratory.

The use of note-books and text-books in Science teaching : methods of recording and treating observational data. Correlation of Science teaching with instruction in English and Drawing.

The construction and use of pictorial illustrations, diagrams and models : the construction of apparatus.

Supplementary means of instruction : records of daily or seasonal observations, the school excursion, school gardens and museums. Laboratory organisation and management.

The following books may be consulted :—

Raymon : "The Principles of Education." (Longmans, Green & Co.)

Monroe : "A Brief Course in the History of Education." (Macmillan & Co.)

McDougall : "Psychology." (*Home University Library*. Williams and Norgate.)

Thomson : "Introduction to Science." (*Home University Library*. Williams and Norgate.)

Westaway : "Scientific Method." Books II., III., and IV. (Blackie & Sons.)

Armstrong : "The Teaching of Scientific Method." (Macmillan and Co.)

One of the three following :—

Dumville : "Fundamentals of Psychology." (Clive & Co.)

Green and Loveday : "Introduction to Psychology." (Clarendon Press.)

Welton : "Psychology of Education." (Macmillan & Co.)

One or more of the three following :—

Adams : "The Herbartian Psychology applied to Education." (D. C. Heath & Co.)

Adams : "Exposition and Illustration in Teaching." (Macmillan & Co.)

Adamson : "The Practice of Instruction." Part I. (National Society's Depository.)

One or more of the following :—

Adamson : "Practice of Instruction." Part II., Section VI. (National Society's Depository.)

Mann : "The Teaching of Physics." (Macmillan & Co.)

Perry : "The Teaching of Mechanics." (Macmillan & Co.)

Rennie : "Lessons in Plant and Animal Life." (Clive & Co.)

Smith and Hall : "The Teaching of Chemistry and Physics in the Secondary School." (Longmans, Green & Co.)

Various Articles in "The Teacher's Encyclopædia." (Caxton Publishing Co.)

One or more of the following :—

Cajori : "History of Physics." (Macmillan & Co.)

Mach : "The Science of Mechanics." (Kegan Paul & Co.)

Thomson : "The Science of Life." (Blackie & Co.)

Thorpe : "Essays in Historical Chemistry." (Macmillan and Co.)

The Alembic Club Reprints. (Simpkin, Marshall & Co.)

CIRCULAR 86.

DEPARTMENT OF AGRICULTURE AND
TECHNICAL INSTRUCTION FOR IRELAND,
UPPER MERRION STREET,

DUBLIN, *December, 1913.*

SIR OR MADAM,

With reference to the classes conducted at the above-named School under the Department's Programme for Day Secondary Schools, I have to acquaint you that, should it be found necessary at any time to omit a lesson upon account of visits to the School by Inspectors of the Intermediate Education Board, the Department would be glad if the words "Intermediate Board Inspection" were inserted in the appropriate column in the Attendance Register. If the lesson thus omitted be given at any other period, previous notice should, when possible, be sent to these Offices. Should it not be found practicable, however, to give such notice a note should be made in the Register to the effect that the additional lesson is in place of the one not held upon account of the visit of the Intermediate Education Board's Inspectors.

I am,

Sir or Madam,

Your obedient Servant,

T. P. GILL,

Secretary.

III.—FOOD AND DRUGS.

DEPARTMENT OF AGRICULTURE AND TECHNICAL
INSTRUCTION FOR IRELAND.

BUTTER AND MARGARINE ACT, 1907.

(Sections 8 and 14 (1).)

LIST OF NAMES APPROVED BY THE DEPARTMENT FOR USE IN
CONNECTION WITH MARGARINE.

NOTE.—Approval by the Department authorises the use of the name in Ireland only. Approval does not confer on any person any exclusive right to the use of the name, nor authorise its use by any person not entitled to use it.

Arcticanus.

Cobno.

Featherweight.

Harmony.

Ivory.

Loving Cup.

May Blossom.

Maybreeze.

Mellownut.

Monte Cristo.

Pearlnut.

Vanco.

Walno.

White Star.

OFFICES : 4 UPPER MERRION STREET,
DUBLIN, 31st *December, 1913.*

NOTES AND MEMORANDA.

A meeting of the Board of Technical Instruction was held on Tuesday, the 16th December, 1913, at the offices of the Department, Upper Merrion Street, Dublin. The following

Meeting of the Board of Technical Instruction. were present:—The Right Hon. T. W. Russell, P.C., M.P., Vice-President of the Department, in the Chair; Mr. Frank Barbour; Mr. Alexander Dickson; Mr. Christopher J. Dunn, J.P.; Mr. William Macartney, J.P.; Mr. John A. McClelland, M.A., D.Sc., F.R.S.; Mr. James P. MacGuire, J.P.; The Most Rev. Richard A. Sheehan, D.D., Lord Bishop of Waterford and Lismore; Mr. Richard Sisk; Mr. Alexander Taylor, and Mr. William Wallace, J.P.

Mr. George Fletcher, Assistant Secretary in respect of Technical Instruction; Mr. T. Butler, Superintendent of the Statistics and Intelligence Branch; Mr. W. Vickers Dixon, Senior Inspector of Technical Instruction; Mr. A. Kelly, and Mr. J. D. Daly (who acted as Secretary to the Meeting), were also present.

The statistics relating to the Summer Herring season of 1913, given in the Statistical Tables (see pp. 424 *et seq.*), show that the total quantity of herrings landed during the season

Summer Herring Fishery, 1913. amounted to almost 229,000 cwts. The money paid for the fish is estimated to have been about £93,000; 41,985 barrels and 4,729 half barrels were cured for exportation and, in addition, 8,000 boxes were kippered.

In the season of 1912 the quantity landed was estimated at over 252,000 cwts., and the value at over £79,000, while nearly 42,000 barrels were cured.

The Board of Agriculture and Fisheries have issued Orders withdrawing all the restrictions on the movement of

Foot-and-Mouth Disease in England. animals which were imposed by them in connection with the outbreak last month of Foot-and-Mouth Disease at Whitewell, near Welwyn, Hertfordshire. The Orders came into operation on Sunday, the 18th January.

STATISTICAL

FISHERY STATISTICS—

STATEMENT of the Total QUANTITY and VALUE of the FISH returned
compared with the

	North Coast				East Coast.			
	1913.		1912.		1913.		1912.	
	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.
	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
Brill,	—	—	—	—	1	1	23	28
Soles,	12	64	10	50	15	70	309	1,248
Turbot,	2	7	3	8	17	82	75	267
Total Prime Fish, .	14	71	13	58	33	153	407	1,543
Cod,	79	60	175	132	292	230	879	722
Conger Eel,	—	—	—	—	40	34	510	339
Haddock,	—	—	11	6	57	60	439	412
Hake,	—	—	—	—	17	25	701	476
Herrings,	945	409	1,865	587	1,821	757	5,840	1,950
Ling,	—	—	—	—	22	25	549	312
Mackerel,	47	12	—	—	2	1	—	—
Plaice,	237	226	156	160	462	557	707	759
Ray or Skate, . . .	234	59	138	35	77	72	498	310
Sprats,	—	—	—	—	—	—	—	—
Whiting,	—	—	—	—	79	72	431	429
All other except Shell Fish	116	57	116	52	234	242	666	363
Total,	1,672	894	2,474	1,030	3,136	2,228	11,627	7,615
SHELL FISH :—	No.		No.		No.		No.	
Crabs,	8,364	22	7,848	18	1,360	7	648	5
Lobsters,	6,336	201	3,672	104	4,908	186	6,073	234
	Cwts.		Cwts.		Cwts.		Cwts.	
Mussels,	—	—	—	—	364	70	464	61
	No.		No.		No.		No.	
Oysters,	—	—	—	—	2,520	3	—	—
	Cwts.		Cwts.		Cwts.		Cwts.	
Other Shell Fish, .	—	—	23	3	113	24	243	83
Total,	—	223	—	125	—	290	—	383
Total value of Fish landed	—	1,117	—	1,155	—	2,518	—	7,998

NOTE.—The above figures are subject

TABLES.

IRELAND.

as landed on the IRISH COASTS during the month of October, 1913, as corresponding period in 1912.

South Coast.				West Coast.				Total.			
1913.		1912.		1913.		1912.		1913.		1912.	
Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
—	—	3	8	14	29	17	33	15	30	43	69
36	152	43	171	24	129	57	243	87	415	419	1,712
—	—	4	17	12	54	37	179	31	143	119	471
36	152	50	196	50	212	111	455	133	588	581	2,252
6	6	5	2	60	22	43	17	437	318	1,102	873
—	—	—	—	3	1	1	1	43	35	511	340
—	—	33	50	51	18	130	99	108	78	613	567
7	6	50	55	7	2	69	32	31	33	820	563
1,035	474	2,544	658	5,385	2,234	3,261	1,283	9,186	3,874	13,510	4,478
—	—	—	—	7	4	—	—	29	29	549	312
5,494	1,676	13,651	3,152	11,333	4,889	15,686	5,350	16,876	6,578	29,337	8,502
274	347	219	247	84	84	101	92	1,057	1,214	1,183	1,258
11	4	44	15	145	17	238	31	467	152	918	391
—	—	545	90	—	—	—	—	—	—	545	90
142	25	96	45	147	70	322	125	368	167	849	599
163	71	206	74	298	134	436	165	811	504	1,424	654
7,168	2,761	17,443	4,584	17,570	7,687	20,398	7,650	29,546	13,570	51,942	20,379
No. 84	1	No. 72	1	No. —	—	No. —	—	No. 9,808	30	No. 8,568	24
2,582	115	3,192	128	5,064	182	2,782	101	18,890	684	15,719	567
Cwts. 80	10	Cwts. —	—	Cwts. 2,828	292	Cwts. 1,000	75	Cwts. 3,272	372	Cwts. 1,464	136
No. 4,536	11	No. —	—	No. 18,207	34	No. 14,040	26	No. 25,263	48	No. 14,040	26
Cwts. 394	56	Cwts. 318	29	Cwts. 489	80	Cwts. 514	87	Cwts. 996	160	Cwts. 1,098	202
—	193	—	158	—	588	—	289	—	1,294	—	955
—	2,954	—	4,742	—	8,275	—	7,939	—	14,864	—	21,834

to correction in Annual Returns.

FISHERY STATISTICS—

STATEMENT of the Total QUANTITY and VALUE of the FISH returned
compared with the

—	North Coast.				East Coast.			
	1913.		1912.		1913.		1912.	
	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.
	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
Brill,	—	—	—	—	—	—	74	103
Soles,	2	10	1	4	14	68	324	1,237
Turbot,	—	—	—	—	19	88	83	300
Total Prime Fish, .	2	10	1	4	33	156	481	1 640
Cod,	244	180	228	155	715	500	1,184	884
Conger Eel,	—	—	—	—	51	46	465	318
Haddock,	10	4	72	40	45	39	415	351
Hake,	—	—	—	—	7	10	642	457
Herrings,	5	3	32	14	13,636	4,831	21,903	4,433
Ling,	—	—	—	—	10	12	564	322
Mackerel	—	—	—	—	—	—	—	—
Plaice,	54	52	15	14	547	663	584	627
Ray or Skate, . . .	144	36	24	6	60	55	464	313
Sprats,	—	—	—	—	—	—	—	—
Whiting,	2	1	10	6	36	33	374	374
All other except Shell Fish	40	20	268	117	219	223	691	335
Total,	501	306	650	356	15,359	6,568	27,767	10,054
SHELL FISH :— . . .	No.		No.		No.		No.	
Crabs,	1,524	3	1,536	3	—	—	324	3
Lobsters,	312	10	528	15	4,458	222	4,666	222
Mussels,	Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	42
Oysters,	No.	—	No.	—	No.	2	No.	—
Other Shell Fish, .	Cwts.	—	Cwts.	2	Cwts.	19	Cwts.	65
Total,	—	13	—	20	—	243	—	332
Total value of Fish landed	—	319	—	376	—	6,811	—	10,386

NOTE.—The above figures are subject

IRELAND.

as Landed on the Irish Coasts during the month of November, 1913,
corresponding period in 1912.

South Coast.				West Coast.				Total.			
1913.		1912.		1913.		1912.		1913.		1912.	
Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.
Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
1	1	3	6	5	14	6	14	6	15	83	123
15	69	43	193	41	152	62	238	72	299	430	1,672
—	—	3	10	26	100	31	138	45	188	117	448
16	70	49	209	72	266	99	390	123	502	630	2,243
31	29	25	18	1	1	109	56	991	710	1,546	1,113
—	—	—	—	—	—	3	1	51	46	468	319
—	—	28	41	83	43	253	167	138	86	768	599
2	3	32	35	15	6	—	—	24	19	674	492
857	395	3,135	1,188	912	441	1,861	770	15,410	5,670	26,931	6,405
—	—	—	—	40	35	5	3	50	47	569	325
1,842	802	12,480	2,989	3,580	2,085	16,384	5,097	5,422	2,857	28,864	8,086
171	178	245	264	45	45	38	37	817	938	882	942
6	3	47	16	53	18	70	10	263	112	605	345
533	81	340	53	—	—	—	—	533	84	340	53
8	8	95	43	120	77	132	111	166	119	611	534
76	44	170	62	236	222	292	159	571	509	1,421	673
3,542	1,616	16,646	4,918	5,157	3,209	19,246	6,801	24,559	11,699	64,309	22,129
No.	—	No.	—	No.	—	No.	—	No.	—	No.	—
—	—	—	—	—	—	—	—	1,524	3	1,860	6
444	16	288	12	684	20	756	21	5,808	268	6,238	270
Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—
75	9	—	—	1,874	290	2,226	365	1,949	299	2,515	407
No.	—	No.	—	No.	—	No.	—	No.	—	No.	—
5,166	12	3,906	8	42,694	64	50,568	66	49,110	78	54,474	74
Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—	Cwts.	—
615	201	444	139	496	114	812	160	1,198	334	1,447	366
—	238	—	159	—	488	—	612	—	982	—	1,123
—	1,854	—	5,077	—	3,697	—	7,413	—	12,681	—	23,252

to correction in Annual Returns.

FISHERY STATISTICS—

STATEMENT of the Total QUANTITY and VALUE of the Fish returned
compared with the

	North Coast.				East Coast.			
	1913.		1912.		1913.		1912.	
	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.
	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
Brill,	—	—	—	—	3	6	74	98
Soles,	2	11	—	—	11	49	44	174
Turbot,	—	—	—	—	7	36	21	82
Total Prime Fish, . .	2	11	—	—	21	91	139	354
Cod,	457	331	221	145	613	420	676	838
Conger Eel,	8	6	—	—	48	42	445	745
Haddock,	90	41	72	37	32	31	414	414
Hake,	—	—	—	—	8	12	354	665
Herrings,	61	36	6,336	2,742	14,391	4,915	16,536	4,011
Ling,	—	—	—	—	10	12	405	286
Mackerel,	2,017	627	523	205	—	—	—	—
Plaice,	25	30	—	—	376	613	205	227
Ray or Skate,	129	33	39	10	55	49	274	143
Sprats,	—	—	—	—	—	—	—	—
Whiting,	2	1	10	8	130	108	426	452
All other except Shell Fish	471	128	22	15	210	168	388	286
Total,	8,262	1,244	7,223	3,162	15,894	6,461	20,262	8,421
SHELL FISH:—	No.		No.		No.		No.	
Crabs,	264	1	966	2	—	—	60	1
Lobsters,	60	2	144	4	4,059	222	1,588	91
Mussels,	Cwts.	—	Cwts.	—	Cwts.	30	Cwts.	35
Oysters,	No.	—	No.	—	120	7	270	—
Other Shell Fish, . .	Cwts.	—	Cwts.	—	4,536	—	—	—
Total,	4	1	—	—	87	18	130	41
Total value of Fish landed	—	4	—	6	—	277	—	168
	—	1,248	—	3,168	—	6,738	—	8,589

NOTE.—The above figures are subject

IRELAND.

as landed on the IRISH COASTS during the month of December, 1913, as corresponding period in 1912.

South Coast.				West Coast.				Total.			
1913.		1912.		1913.		1912.		1913.		1912.	
Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity	Value.	Quan- tity.	Value.	Quan- tity	Value.	Quan- tity.	Value.
Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
2	8	1	2	11	22	2	5	16	36	77	105
23	94	19	98	47	186	37	115	83	340	100	387
1	4	—	—	27	133	18	70	35	173	39	152
26	106	20	100	85	341	57	190	134	549	216	644
55	39	8	6	286	127	36	25	1,411	917	941	1,014
—	—	—	—	69	28	6	2	125	76	451	747
10	10	14	21	303	210	167	126	435	292	667	598
—	—	23	23	—	—	—	—	8	12	377	688
4,682	1,463	659	303	199	77	36	14	19,333	6,491	23,567	7,070
—	—	—	—	70	39	2	1	80	51	407	287
2,857	1,136	540	162	20,508	7,895	2,346	701	25,382	9,658	3,409	1,068
170	191	58	66	144	155	16	20	715	989	279	313
7	4	25	9	116	29	1	1	307	115	339	163
540	87	—	—	—	—	—	—	540	87	—	—
4	3	35	13	198	188	187	127	334	300	658	600
49	24	112	41	199	103	64	46	929	423	586	388
8,400	3,063	1,494	744	22,177	9,192	2,918	1,253	49,733	19,960	31,897	13,580
No.	—	No.	—	No.	—	No.	—	No.	264	No.	3
30	2	—	—	744	28	1,200	48	4,893	254	2,932	143
Cwts.	9	Cwts.	—	2,241	357	1,210	207	2,431	396	1,480	242
No.	—	No.	—	No.	—	No.	—	No.	—	No.	—
5,166	11	4,032	8	475,962	931	557,112	1,096	485,664	949	561,144	1,104
Cwts.	168	Cwts.	119	947	210	578	151	1,634	397	1,180	311
—	190	—	127	—	1,526	—	1,502	—	1,997	—	1,803
—	3,253	—	871	—	10,718	—	2,755	—	21,957	—	15,383

to correction in Annual Returns.

STATEMENT of the TOTAL QUANTITY of FISH landed on the ENGLISH and WELSH COASTS during the Month and Twelve Months ended 31st December, 1913, compared with the corresponding periods of the Year 1912.

	December.		Twelve months ended 31st December.	
	1913.	1912.	1913.	1912.
	QUANTITY.			
	Cwts.	Cwts.	Cwts.	Cwts.
Brill,	2,149	1,802	19,952	18,053
Soles,	6,156	5,015	63,753	70,179
Turbot,	6,807	6,714	64,904	62,050
Prime Fish not separately distinguished,	25	81	2,460	5,086
Total Prime Fish,	15,137	13,612	154,074	155,368
Bream,	8,832	8,587	106,714	113,395
Catfish,	2,588	2,250	160,188	99,295
Coalfish,	13,943	17,456	333,493	361,305
Cod,	175,410	196,682	2,646,676	2,486,762
Conger Eels,	5,739	2,910	55,191	58,549
Dabs,	9,534	8,464	107,347	98,743
Dogfish,	14,884	11,996	64,949	55,539
Dory,	187	82	2,226	1,996
Flounders or Flukes,	345	346	6,015	7,459
Gurnards,	8,156	7,671	105,521	92,553
Haddock,	99,452	129,045	1,553,868	1,972,338
Hake,	30,470	24,567	621,238	714,906
Halibut,	3,423	5,367	106,662	118,393
Latchets (Tubs),	390	302	2,930	2,358
Lemon Soles,	2,832	2,475	59,533	59,057
Ling,	9,552	10,700	214,054	189,340
Megrims,	5,048	4,159	74,664	86,417
Monks (or Anglers),	3,913	3,500	38,394	37,972
Mullet (Red),	16	22	222	323
Plaice,	60,923	46,931	699,118	834,271
Pollack,	609	482	12,394	14,975
Skates and Rays,	29,410	28,687	359,471	368,207
Torsk,	656	797	31,974	24,980
Whiting,	41,646	38,373	427,254	407,770
Witches,	3,523	3,519	36,267	32,894
Herrings,	206,740	31,554	7,313,425	5,377,141
Mackerel,	16,798	1,172	345,095	333,256
Mullet (Grey)	125	110	772	552
Pilchards,	355	88	51,563	70,107
Sprats,	45,959	40,928	75,156	74,223
Whitebait,	300	537	5,594	6,742
Fish not separately distinguished,	23,856	21,989	347,262	354,366
Total,	840,734	665,340	16,149,874	14,611,612
Shell Fish :—	No.	No.	No.	No.
Crabs,	67,416	63,250	5,587,692	5,720,869
Lobsters,	12,052	7,771	634,079	640,916
Oysters,	3,816,165	4,239,935	27,831,524	33,389,078
Other Shell Fish,	Cwts. 49,774	Cwts. 52,859	Cwts. 574,758	Cwts. 529,573

NOTE.—The figures for 1913 are subject to correction.

STATEMENT of the TOTAL VALUE of FISH landed on the ENGLISH and WELSH COASTS during the Month and Twelve Months ended 31st December, 1913, compared with the corresponding periods of the Year 1912.

	December.		Twelve months ended 31st December.	
	1913.	1912.	1913.	1912.
VALUE.				
	£	£	£	£
Brill,	7,544	6,486	71,698	63,523
Soles,	42,480	36,137	465,242	464,304
Turbot,	33,120	32,478	287,127	282,153
Prime Fish not separately distinguished,	34	132	3,832	7,718
Total Prime Fish,	83,178	75,233	827,899	817,698
Bream,	3,351	2,727	23,527	24,916
Catfish,	1,909	1,397	63,832	41,676
Coalfish,	7,032	7,166	118,122	102,741
Cod,	154,237	148,807	1,700,942	1,448,269
Conger Eels,	4,240	2,465	40,153	39,245
Dabs,	9,271	8,537	100,427	79,117
Dogfish,	3,682	4,112	20,230	16,083
Dory,	227	105	2,317	1,970
Flounders or Flukes,	312	274	4,814	4,624
Gurnards,	2,313	2,802	31,040	28,370
Haddock,	103,677	118,630	1,334,518	1,350,188
Hake,	42,926	32,829	656,775	598,112
Halibut,	15,834	20,228	349,169	355,401
Latchetts (Tubs),	208	168	1,608	1,289
Lemon Soles,	11,003	9,230	162,472	140,972
Ling,	6,503	6,091	109,047	90,335
Megrims,	4,674	4,450	63,679	63,930
Monks (or Anglers),	2,518	2,039	21,747	17,893
Mullet (Red)	43	86	723	910
Plaice,	83,623	81,102	1,011,213	1,051,016
Pollack,	503	399	8,820	8,868
Skates and Rays,	21,573	21,863	253,757	235,632
Torsk,	519	394	12,054	9,465
Whiting,	30,376	26,262	280,326	223,039
Witches,	5,474	5,533	47,426	39,727
Herrings,	98,824	20,805	2,319,084	1,664,824
Mackerel,	9,513	1,122	167,336	167,007
Mullet (Grey),	216	287	1,627	1,215
Pilchards,	178	18	21,895	28,827
Sprats,	9,638	6,485	17,791	14,306
Whitebait	710	1,238	12,717	14,464
Fish not separately distinguished,	12,733	12,799	195,152	202,218
Total,	737,636	625,680	9,987,112	8,884,347
Shell Fish:—				
Crabs,	937	870	62,032	60,756
Lobsters,	707	470	30,782	30,581
Oysters,	13,143	13,895	81,082	106,990
Other Shell Fish,	9,784	10,094	140,810	128,207
Total,	21,626	25,329	324,696	326,534
Total value of all Fish,	762,262	651,009	10,311,808	9,210,881

NOTE.—The figures for 1913 are subject to correction.

**STATEMENT of the TOTAL QUANTITY of the FISH landed on the
SCOTTISH COASTS during the Month and Twelve Months ended
31st December, 1918, compared with the corresponding periods
of the year 1912.**

	December.		Twelve Months ended 31st December.	
	1913.	1912.	1913.	1912.
	Quantity			
	Cwts.	Cwts.	Cwts.	Cwts.
Herrings	52,277	85,520	4,449,283	5,301,256
Sprats	3,665	904	8,117	5,597
Sparlings	15	38	304	400
Mackerel	1,771	666	74,319	47,997
Cod	57,781	64,504	872,949	919,817
Codling				
Ling	6,071	4,809	209,331	179,971
Torsk (Tusk)	599	629	17,254	16,493
Saith (Coal Fish)	25,329	14,364	320,937	225,334
Haddocks, Extra Large	51,753	89,587	650,930	890,850
Do. Large				
Do. Medium				
Do. Small	25,155	17,425	220,060	173,066
Whittings				
Conger Eels	519	481	21,931	36,564
Gurnards	672	282	6,544	8,475
Catfish	556	563	24,941	26,420
Monks (Anglers)	2,605	2,047	24,397	22,270
Hake	1,096	798	18,831	20,141
Squids	9	31	28	157
Turbot	302	192	3,635	4,125
Halibut	1,336	1,217	46,123	47,399
Lemon Soles	1,727	1,614	35,328	39,841
Flounders	341	246	8,148	9,687
Plaice, Large	3,133	2,355	42,976	47,759
Do. Medium				
Do. Small				
Brill	39	26	199	252
Dabs	1,024	856	9,582	10,568
Witches	4,255	3,063	28,186	17,638
Megrims	1,390	1,032	18,129	17,139
Skates and Rays	7,729	6,638	133,189	142,527
Unclassified Kinds	773	306	14,232	6,093
Total	251,922	300,193	7,259,883	8,217,836
Shell Fish :—	No.	No.	No.	No.
Crabs	61,974	86,958	2,176,346	2,144,545
Lobsters	44,017	34,224	676,999	624,703
Oysters	115,620	259,600	1,316,100	1,350,163
Clams	954	1,211	9,289	8,640
Mussels	10,593	12,322	78,576	99,405
Unclassified	3,460	2,121	40,613	40,512

NOTE.—The above figures are subject to correction in the Annual Returns.

Statement of the TOTAL VALUE of the FISH landed on the SCOTTISH COASTS during the Month and Twelve Months ended 31st December, 1913, compared with the corresponding periods of the year 1912.

	December.		Twelve Months ended 31st December.	
	1913.	1912.	1913.	1912.
	Value			
	£	£	£	£
Herrings	26,226	36,329	2,088,314	1,910,511
Sprats	530	253	1,772	1,866
Sparling	40	177	900	1,063
Mackerel	421	398	10,184	8,736
Cod	41,586	37,678	459,599	418,991
Codling				
Ling				
Torsk (Tusk)	2,682	1,828	77,242	57,105
Saith (Coal Fish)	276	204	6,334	5,111
5414	3,018	52,233	33,158	
Haddocks, Extra Large	50,409	62,051	516,544	553,750
Do. Large				
Do. Medium				
Do. Small	16,320	8,042	103,866	69,927
Whittings				
Conger Eels				
Gurnards	303	222	9,956	11,454
Catfish	134	41	1,040	1,406
Monks (Anglers)	258	222	6,968	7,373
Hake	768	660	6,562	5,413
Squids	1,322	930	15,825	12,129
Turbot	1	5	3	57
Halibut	1,136	856	12,264	14,049
Lemon Soles	4,620	3,856	107,480	104,845
Flounders	5,330	4,878	81,479	82,224
Plaice, Large	358	205	5,440	5,770
Do. Medium	5,193	4,019	67,818	66,534
Do. Small				
Brill				
Dabs	75	59	404	550
Witches	459	317	3,935	3,841
Megrimms	3,840	3,738	27,820	18,639
Skates and Rays	1,868	1,328	22,037	18,277
Unclassified kinds	2,442	1,891	35,322	36,844
	182	72	2,016	1,196
Total	172,098	173,338	3,723,357	3,450,819
Shell Fish :—				
Crabs	265	417	13,964	13,708
Lobsters	2,982	2,194	36,414	32,173
Oysters	464	915	4,757	4,744
Clams	145	145	1,254	1,253
Mussels	604	659	4,371	5,327
Unclassified	925	523	11,205	10,474
Total Value	5,385	4,853	71,965	67,679
Total Value of all Fish	177,478	178,191	3,795,322	3,518,498

NOTE.—The above figures are subject to correction in the Annual Returns.

STATEMENT of the TOTAL QUANTITY and VALUE of the FISH returned as landed on the IRISH COASTS during the Month and Twelve Months ended 31st December, 1913, compared with the corresponding periods of the Year 1912.

	December.		Twelve Months ended 31st December.	
	1913.	1912.	1913.	1912.
QUANTITY.				
Brill,	Owts. 16	Owts. 77	Owts. 392	Owts. 648
Sole,	83	100	1,928	3,393
Turbot,	85	39	560	997
Total Prime Fish,	134	216	2,880	5,038
Cod,	1,411	941	20,337	29,627
Conger Eel,	125	451	5,049	6,149
Haddock,	435	667	10,190	14,859
Hake,	8	377	5,115	8,973
Herrings,	19,333	23,567	410,768	458,926
Ling,	80	407	7,213	9,598
Mackerel,	25,382	3,409	131,693	212,165
Plaice,	715	279	11,356	11,711
Ray or Skate,	307	339	6,909	9,097
Sprats,	540	—	1,464	943
Whiting,	334	658	7,324	11,501
Fish not separately distinguished, except Shell Fish,	929	586	16,509	23,444
Total,	49,733	31,897	636,807	802,031
Shell Fish:—	No.	No.	No.	No.
Crabs,	264	1,026	199,258	276,603
Lobsters,	4,893	2,932	570,428	508,986
Oysters,	485,644	561,144	639,757	824,187
Mussels,	Owts. 2,431	Owts. 1,480	Owts. 15,088	Owts. 8,672
Other Shell Fish,	1,634	1,180	14,873	15,462
VALUE.				
Brill,	£ 36	£ 105	£ 953	£ 1,105
Sole,	340	387	8,559	14,242
Turbot,	173	152	2,479	3,841
Total Prime Fish,	549	644	11,991	19,188
Cod,	917	1,014	15,709	17,426
Conger Eel,	76	747	3,813	4,179
Haddock,	292	598	6,692	10,265
Hake,	12	688	6,218	7,076
Herrings,	6,491	7,070	155,464	124,979
Ling,	51	287	5,472	5,046
Mackerel,	9,658	1,068	43,912	57,473
Plaice,	989	313	11,956	11,808
Ray or Skate,	115	163	3,428	4,632
Sprats,	87	—	214	155
Whiting,	300	600	5,430	8,073
Fish not separately distinguished, except Shell Fish,	423	388	10,596	10,082
Total,	19,960	13,580	280,945	280,384
Shell Fish:—				
Crabs,	1	3	1,050	1,416
Lobsters,	254	143	20,801	17,490
Oysters,	949	1,104	1,226	1,497
Mussels,	396	242	2,124	1,127
Other Shell Fish,	397	311	3,621	4,165
Total,	1,997	1,803	28,822	25,695
Total Value of Fish landed,	21,957	16,383	309,767	306,079

NOTE.—The above figures are subject to correction in the Annual Returns.

QUARTERLY AVERAGE PRICES OF CROPS, LIVE STOCK, MEAT, PROVISIONS, &c.,
for the period ended 31st December, 1913

PRODUCT.	PROVINCE.				IRELAND.	
	Leinster.	Munster.	Ulster.	Con-naught.	1913.	1912.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
CROPS :—						
Wheat, . . . per 112 lbs.	7 4	6 10½	—	—	7 4½	7 8½
Oats (White) . . . "	6 6½	6 0½	5 10½	5 9½	5 11½	6 11½
" (Black) . . . "	5 9	5 3½	—	—	5 4	6 3
Barley, . . . "	7 5½	7 3½	—	7 2	7 3½	8 9½
Potatoes . . . "	3 1	3 3	2 3½	3 0	2 10½	3 10½
Hay (Clover) . . . "	4 0½	2 11	2 11½	2 9½	3 1½	3 4½
" (Meadow) . . . "	2 9½	1 11½	2 7½	1 11½	2 3½	2 4
Grass Seed—						
(Perennial Rye) . . . "	—	—	9 5½	—	9 5½	11 10½
(Italian Rye) . . . "	—	—	12 0½	—	12 0½	16 11
Flax . . . per 14 lbs.	—	—	6 7½	—	6 7½	8 2½
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
LIVE STOCK :—						
Calves (young) . . . per head	2 8 9	2 6 0	2 4 0	2 15 0	2 9 0	2 3 5
Store Cattle—						
Over 6 and not exceeding						
12 months . . . per head	5 12 3	4 10 9	5 11 3	5 15 9	5 3 6	4 5 8
One year old and under two						
years . . . per head	9 5 3	8 11 3	8 8 3	9 1 0	8 16 3	7 16 1
Two years old and under						
three years . . . per head	12 11 9	11 2 6	11 7 3	12 3 6	11 16 9	10 12 10
Three years old and over ..	15 4 3	11 10 3	—	14 4 6	13 10 3	12 10 1
Fat Cattle—						
Two years old and under						
three years . . . per head	15 0 9	14 19 3	15 7 3	15 14 9	15 4 0	13 8 0
Three years old and over ..	17 2 3	15 10 6	16 18 0	15 0 9	10 7 3	15 9 11
Cows and Bulls . . . per head	14 4 3	12 19 6	14 5 3	13 17 0	13 7 0	11 13 4
Springers—						
Cows and Heifers . . . per head	16 8 9	14 10 0	16 9 0	16 2 9	15 19 3	13 11 10
Milch Cows (down calved)	15 5 9	14 8 6	14 16 3	14 1 3	14 14 9	12 12 2
Lambs (under 12 months old)						
per head	1 11 9	1 11 9	1 8 6	1 10 0	1 11 3	1 4 6
Store Sheep—						
One year old and under two						
years . . . per head	1 17 0	2 0 9	1 16 0	2 1 9	2 0 6	1 9 9
Two years old and over ..	1 13 0	1 3 10	1 9 3	2 5 6	1 18 9	1 11 10
Fat Sheep—						
One year old and under two						
years . . . per head	2 6 6	2 10 0	2 2 9	2 13 3	2 9 6	2 1 3
Two years old and over ..	2 6 3	2 1 0	2 3 3	2 18 3	2 7 6	2 0 0
Young Pigs—						
8 to 10 weeks old . . . "	1 9 0	1 11 6	1 14 3	1 14 9	1 12 6	1 0 9
Store Pigs—						
10 weeks to 4 months old ..	2 3 3	1 12 6	3 1 3	—	1 19 3	1 7 4
4 months old and over ..	2 9 9	2 1 9	—	—	2 2 6	1 14 11
Fat Pigs "	4 14 3	4 5 0	—	5 16 0	5 10 9	4 12 8
Sows, "	6 8 3	7 16 9	6 17 9	7 17 9	7 11 3	6 2 4
MEAT, PROVISIONS, &c.						
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Beef (Live) . . . per 112 lbs.	—	—	—	—	33 8	30 4
(Dead) "	—	—	—	—	58 11	53 1
Mutton (Live) . . . "	—	—	—	—	38 5	30 10
(Dead) "	—	—	—	—	67 3	54 0
Pork (Dead) . . . "	60 7	60 3	59 8	58 11	60 2	55 4
Butter (Creamery) . . . "	123 2	121 3	—	—	121 6	120 9
" (Factory) . . . "	92 0	98 1	—	—	98 1	100 4
" (Farmers') . . . "	95 9	99 4	93 4	97 1	98 0	98 0
Eggs per 120	14 8½	13 9½	—	13 1½	14 2½	13 4
Wool per lb.	0 11½	—	—	1 0	0 11½	0 11½

WEEKLY AVERAGE PRICES of WHEAT, OATS, and BARLEY, per 112 lbs.
computed from Market Returns of certain quantities of these Cereals
supplied by Officers of Customs and Excise, during the QUARTER
ended 31st December, 1913.

Returns received in the Week ended	WHEAT.		OATS.		BARLEY.	
	Average Price per 112 lbs.	Quantity.	Average Price per 112 lbs.	Quantity.	Average Price per 112 lbs.	Quantity
1913.		Cwts. of 112 lbs.		Cwts. of 112 lbs.		Cwts. of 112 lbs.
October 4	7 7	750	5 8½	31,856	7 5	8,612
" 11	7 7½	750	5 7	30,467	7 4	11,240
" 18	7 6½	428	5 5½	27,710	7 2½	12,012
" 25	7 5	852	5 5	17,122	7 5	13,822
November 1	7 5½	716	5 5½	13,626	7 2½	4,754
" 8	7 5	519	5 3½	11,667	7 2½	2,788
" 15	7 3½	421	5 5½	15,450	7 2½	1,948
" 22	7 1	838	5 7½	10,041	7 0½	562
" 29	7 2	889	5 7½	13,457	7 2½	308
December 6	7 0½	886	5 9	9,769	7 1	870
" 13	7 4½	250	5 9½	12,444	7 0½	676
" 20	7 2½	250	5 8	13,495	6 11½	570
" 27	7 4½	1,475	5 9½	4,090	7 0	136

QUARTERLY AVERAGE PRICES of FAT CATTLE and FAT SHEEP, per 112 lbs., LIVE
WEIGHT, sold in DUBLIN MARKETS during the period ended 31st
December, 1913, and also for the corresponding period during sixteen
preceding years.

Year.	Fat Cattle.	Fat Sheep.	Year.
	£ s. d.	£ s. d.	
1913,	1 13 8	1 18 5	1913.
1912,	1 10 4	1 10 10	1912.
1911,	1 12 7	1 10 6	1911.
1910,	1 12 1	1 12 1	1910.
1909,	1 11 9	1 8 5	1909.
1908,	1 11 4	1 11 6	1908.
1907,	1 9 6	1 15 7	1907.
1906,	1 9 0	1 17 10	1906.
1905,	1 8 3	1 14 6	1905.
1904,	1 9 2	1 15 0	1904.
1903,	1 9 5	1 13 10	1903.
1902,	1 11 5	1 12 3	1902.
1901,	1 9 11	1 10 3	1901.
1900,	1 10 7	1 12 4	1900.
1899,	1 10 8	1 12 4	1899.
1898,	1 7 9	1 11 5	1898.
1897,	1 8 2	1 12 7	1897.

NUMBER of ANIMALS included in Returns furnished under the MARKERS and FAIRS (Weighing of Cattle) ACT, 1891, Sections 3 and 4,
during the Quarter ended 31st December, 1913.

WEEK ENDED	FAT CATTLE.					FAT SHEEP.			
	Dublin.		Belfast.		Total Number of Cattle included in Returns.	Dublin.		Belfast.	Total Number of Sheep included in Returns.
	Corporation Market Authorities.	Mr. Gavin Low, Auctioneer.	Corporation Market Authorities.	Mr. John Robson, Auctioneer.		Corporation Market Authorities.	Mr. Gavin Low, Auctioneer.		
1913.									
October 2 .	99	105	64	49	317	18	113	—	131
" 9 .	125	169	67	90	451	—	250	—	250
" 16 .	123	216	64	117	520	—	152	—	152
" 23 .	128	161	67	92	448	—	84	—	84
" 30 .	108	148	68	84	408	14	246	—	260
November 6 .	111	240	70	99	520	—	283	—	283
" 13 .	104	165	71	73	413	—	337	—	337
" 20 .	112	93	68	68	338	—	116	—	116
" 27 .	84	132	68	44	328	—	201	—	201
December 4 .	84	155	67	60	366	—	223	—	223
" 11 .	35	141	66	77	319	—	175	—	175
" 18 .	57	147	70	53	327	—	122	—	122
" 25 .	60	59	—	—	119	—	54	—	54
Totals,	1,230	1,931	807	906	4,874	32	2,356	—	2,388

BUTTER PRICES DURING THE QUARTER

ABSTRACTED FROM "THE GROCER," "GROCER'S REVIEW,"

Excepting 1-lb. Rolls and Farmers' Butter all quotations are the an Irish Creamery would be 5s. to 7s. per cwt. less than freight, commission,

COUNTRY OF ORIGIN	Type of Package.	Place of Sale.	WEEK ENDED			
			OCTOBER			
			4th.	11th.	18th.	25th.
IRELAND— Creamery Butter.	Kieis, kegs, or pyramid boxes	London, . . .	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.
		Liverpool, . . .	120-124	118-124	118-124	118-124
		Bristol, . . .	120-124	118-122	118-123	120-127
		Cardiff, . . .	124-128	124-128	125-128	128-130
		Manchester, . . .	124-128	124-127	124-127	126-132
		Birmingham, . . .	120-128	120-126	122-128	122-130
		Glasgow, . . .	124-128	124-126	124-126	126-128
		Limerick, . . .	123-125	123-125	123-125	125-126
		Cork, . . .	—	—	—	—
		Belfast, . . .	—	—	—	—
	1lb. rolls, in boxes, Salted or Unsalted.	Dublin, . . .	122-126	122-124	122-126	124-126
		F.O.R., . . .	130/8-135/4	130/8-135/4	130/8-135/4	130/8-135/4
	Factories.	London, . . .	96-110	—	98-109	98-108
		Liverpool, . . .	97-108	96-108	97-108	96-108
		Bristol, . . .	98-104	98-104	98-104	98-104
Farmers' Butter,	Firkins 1st, Export Price	Cardiff, . . .	98-98	110-112	101-104	98-102
		Manchester, . . .	—	—	—	—
		Cork, . . .	98-99	99-100	100-102	100
		Cork, . . .	94-95	90-94	93-95	92-94
		Cork, . . .	86-87	83-86	83-84	83-86
	Do. 2nd " Do. 3rd " Fresh, . . .	Cork, . . .	105-106	105-108	100-105	98-107
		London, . . .	Per doz. lbs.	Per doz. lbs.	Per doz. lbs.	Per doz. lbs.
		Paris baskets, . . .	11/6-14/6	11/6-14/6	12-15	12-15
		do., . . .	Per cwt.	Per cwt.	Per cwt.	Per cwt.
		do., . . .	116-125	116-125	120-129	120-129
FRANCE, DENMARK AND SWEDEN.	Kieis, . . .	Copenhagen Quotation. {	112 Kr. 125/5 per 50 cwt.	112 Kr. 125/5 per 50 cwt.	114 Kr. 127/7 per 50 cwt.	114 Kr. 127/7 per 50 cwt.
		Average over-price	—	—	—	—
		London, . . .	132-134	132-134	133-136	133-136
		Liverpool, . . .	131-136	130-134	130-135	131-138
		Bristol, . . .	—	—	—	—
		Cardiff, . . .	138-140	140	140	144
		Manchester, . . .	132-136	131-136	132-136	133-138
		Birmingham, . . .	134-136	134-136	134-136	136-138
		Newcastle-on Tyne, . . .	132-134	132-134	133-136	134-136
		Glasgow, . . .	133-135	133-135	133-135	134/6-138/6
	1lb. rolls, 10x24 lb. boxes.	Lith, . . .	132/6-132/6	132/6-132/6	133	134-135
		Hull, . . .	131-133	133-130	133-133	133-134
		F.O.R. London	—	—	—	—
		Finland, . . .	128-132	127-131	129-133	129-134
		Liverpool, . . .	128-132	128-131	129-133	129-133
FINLAND,	Kieis, . . .	Hull, . . .	120-122	120-122	121-123	122-125
		Cardiff, . . .	—	—	—	—
		Cardiff, . . .	—	—	—	—

ENDED 31ST DECEMBER, 1913.

"GROCER'S GAZETTE," AND OTHER TRADE REPORTS.

Landed Prices of the Choicest Qualities. The Nett F.O.R. Price to the Landed Prices in Great Britain. This figure covers handling, &c.

WEEK ENDED								
NOVEMBER.					DECEMBER.			
1st.	8th.	15th.	22nd.	29th.	6th.	13th.	20th.	27th.
Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.
120-126	—	—	—	—	—	—	—	—
122-130	121-130	119-128	120-128	122-128	123-128	123-125	125-127	125-127
128-130	128-132	127-132	126-132	—	130	—	—	—
130-134	128-132	126-130	126-131	129-131	129-130	—	—	—
122-129	118/6-130	123-128	122-127	125-128	123-128	126-128	—	—
126-129	126-129	126-128	125-127	127-129	—	—	—	—
127-128	127-128	124-126	125-126	126-127	126-128	128-129	128-129	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
126-130	128-130	126-130	126-128	126-130	128-130	128-135	133-135	133-135
130/8-135/4	130/8-140	130/8-140	135/4-140	135/4-140	140	144/8	144/8	144/8
—	—	—	—	—	—	—	—	—
96-108	100-108	96-108	96-108	96-108	96-104	98-104	98-105	—
98-104	98-104	97-103	97-103	98-108	102-108	98-108	95-108	100-108
103-106	—	—	104-108	98-105	95-100	—	98-104	95-102
100	100	100	100	100-101	101-107	107-118	118	118
92-94	89-94	85-92	85-91	92-93	93-95	97-103	103-112	103-112
83-86	83-84	82-83	80-83	83-85	84-86	83-88	86-87	85-88
100-104	100-103	98-102	98-101	101-102	102-103	103-105	105-113	113
Per doz. lbs.	Per doz. lbs.	Per doz. lbs.	Per doz. lbs.	Per doz. lbs.	Per doz. lbs.	Per doz. lbs.	Per doz. lbs.	Per doz. lbs.
12-15	12-15	12-15	12/6-15/6	12/6-15/6	12/6-15/6	13-16	13-16	—
Per cwt.	Per cwt.	Per cwt.	Per cwt.	Per cwt.	Per cwt.	Per cwt.	Per cwt.	Per cwt.
120-129	116-129	115-129	120-133	120-133	120-133	124-137	124-137	—
114 } Kr. } 127/7 per } 50 } cwt. Kilos }	111 } Kr. } 124/2 per } 50 } cwt. Kilos }	110 } Kr. } 122/11 per } 50 } cwt. Kilos }	110 } Kr. } 122/11 per } 50 } cwt. Kilos }	110 } Kr. } 122/11 per } 50 } cwt. Kilos }	110 } Kr. } 122/11 per } 50 } cwt. Kilos }	111 } Kr. } 124/2 per } 50 } cwt. Kilos }	111 } Kr. } 124/2 per } 50 } cwt. Kilos }	111 } Kr. } 124/2 per } 50 } cwt. Kilos }
133-135	130-132	129-131	129-131	129-131	129-132	130-133	130-133	—
131-137	127-136	121-132	124-132	125-132	126-133	126-134	127-134	127-133
142	140-142	138	134	134-135	134-135	135	138	135-137
132-138	127/6-136	127-132	128-132	128-133	129-133	129-134	130-134	129-134
136-139	134-137	130-134	131-134	132-134	132-134	132-134	133-135	133-135
132-136	128-133	126-129	127-130	128-132	129-131	130-133	131-133	131-133
134-136	132/8-134/6	129-130	129-130	130-131	131-132	132-133	132-133	132-133
134-135	133/6	127-129	127-128	128-129	130	130-130/6	131/6	—
132-134	132-133	129-131	128-130	128-130	129-130	128-130	130-132	130-132
—	—	—	—	—	—	—	—	—
129-133	124/6-132	124-131	125-131	126-131	127-133	127-131	128-133	128-131
129-133	126-128	120-122	123-126	123-127	124-127	124-127	126-128	126-128
123-125	122-124	120-121	120-122	120-122	120-122	120-122	121-123	122-123

[Continued on pages 410 and 411]

BUTTER PRICES DURING THE QUARTER **ABSTRACTED FROM "THE GROCER," "GROCER'S REVIEW,"**

Excepting 1-lb. Rolls and Farmers' Butter all quotations are the
an Irish Creamery would be 5s. to 7s. per cwt. less than
freight, commission,

COUNTRY OF ORIGIN	Type of Package.	Place of Sale.	WEEK ENDED.			
			OCTOBER			
			4th.	11th.	18th.	25th.
RUSSIA AND SIBERIA,	Kieis,	London,	Per cwt. s. s. 104-108	Per cwt. s. s. 104-108	Per cwt. s. s. 106-110	Per cwt. s. s. 106-110
		Liverpool,	96-110	96-108	96-110	96-110
		Bristol,	108-109	108-114	108-114	110-114
		Cardiff,	112-114	108-112	109-111	106-111
		Manchester,	100-110	100-112	109-112	100-112
		Birmingham,	106-112	106-112	106-112	108-114
		Glasgow,	108-110	108-109	100-112	112-114
		Leith, Hull,	109 —	106-110 —	106-110 —	106-110 —
HOLLAND,	Boxes,	London,	120-124	120-124	—	124-128
	Rolls,	do.,	Per doz. lbs. 14-14/6	Per doz. lbs. 14-14/6	Per doz. lbs. 14-14/6	Per doz. lbs. 14-14/6
	Boxes,	Glasgow,—	Per cwt. —	Per cwt. —	Per cwt. —	Per cwt. —
		Fresh,	—	—	—	—
		Salt,	—	—	—	—
		Manchester, Hull,	128-130	128-129	128-130	128-130
ITALY,	Rolls,	London,	Per doz. lbs. —	Per doz. lbs. —	Per doz. lbs. —	Per doz. lbs. —
CANADA,	56 lb. boxes,	London,	Per cwt. —	Per cwt. —	Per cwt. —	Per cwt. —
		Liverpool,	—	—	—	—
		Bristol,	—	—	—	—
		Cardiff,	—	—	—	—
		Birmingham,	—	—	—	—
		Manchester,	—	—	—	—
		Glasgow,	—	—	—	—
AUSTRALIA AND NEW ZEALAND, *	Boxes.	London,	A.s. 112-116 u. 114-118	A.s. 112-116 u. 114-118	A.s. 114-122 u. 118-124	A.s. 114-122 u. 118-126
		Liverpool,	Z. —	Z. —	Z. —	Z. —
		Bristol,	A. —	A. —	A. —	A. —
		Cardiff,	Z. —	Z. —	Z. —	Z. —
		Manchester,	A. 106-120	A. 116-124	A. 118-124	A. 120-126
		Cardiff,	Z. —	Z. —	Z. —	Z. —
		Manchester,	A. 120-122	A. —	A. —	A. —
		Birmingham,	Z. 126	Z. —	Z. —	Z. —
		Glasgow,	A. —	A. —	A. —	A. —
		Leith,	Z. —	Z. —	Z. —	Z. —
		Hull,	A. —	A. —	A. —	A. —
			Z. —	Z. —	Z. —	Z. —
			A. 120	A. 120	A. 120	A. 120-122
			Z. —	Z. —	Z. —	Z. —
			A. —	A. —	A. —	A. —
			Z. —	Z. —	Z. —	Z. —
ARGENTINA,	Boxes,	London,	118-120	116-120	116-122	116-122
		Liverpool,	—	—	—	—
		Bristol,	—	—	—	—
		Cardiff,	126	—	—	—
		Manchester,	—	—	—	—
		Birmingham, Glasgow,	—	—	—	—
UNITED STATES,	Tubs and boxes,	London,	—	—	—	—
		Liverpool,	—	—	—	—
		Bristol,	—	—	—	—
		Cardiff,	—	—	—	—
		Manchester,	—	—	—	—

A.—Australia.

Z.—New Zealand.

s.—salted,

u.—unsalted,

ENDED 31ST DECEMBER, 1913—Continued.

"GROCER'S GAZETTE," AND OTHER TRADE REPORTS.

Landed Prices of the Choicest Qualities. The Nett F.O.R. Price to
the Landed Prices in Great Britain. This figure covers
handling, &c.

[illegible]

TABLES SHOWING THE EXPORTS

TABLE

RETURN of the NUMBER of ANIMALS EXPORTED from IRELAND to GREAT
the PORTS of EMBARKATION

IRISH PORTS.	CATTLE.							SHEEP.			
	Fat.	Stores (fatten- ing).	Milch Cows.	Spring- ers.	Other Cattle.	Calves.	Total.	Fat.	Stores.	Lambs.	Total.
Ballina, .	364	—	—	—	448	—	812	640	—	1,642	2,282
Belfast, .	17,915	32,638	2,769	2,914	95	275	56,606	2,257	948	154	3,359
Coleraine, .	—	127	—	8	—	—	135	—	—	—	—
Cork, .	7,205	17,814	1,204	2,208	200	9,952	38,583	6,088	871	371	7,330
Drogheda, .	15,421	3,791	444	13	—	5	19,674	7,235	—	—	7,235
Dublin, .	45,777	16,846	5,174	403	93	1,600	69,893	40,114	2	—	40,116
Dundak, .	7,710	8,386	194	95	10	—	16,395	17,483	100	—	17,583
Dundrum, .	—	—	—	—	—	—	—	—	—	—	—
Greenore, .	1,641	13,996	1,167	681	—	25	17,510	2,248	—	—	2,248
Larne, .	164	5,265	160	62	—	643	6,294	37	46	—	83
Limerick, .	274	54	—	—	845	—	1,173	—	—	—	—
Londonderry, .	2,361	18,156	327	1,026	10	2,472	24,352	5,695	2,711	—	8,406
Milford, .	—	23	3	—	—	—	26	—	—	—	—
Mulroy, .	10	—	10	—	—	—	20	87	—	5	92
Newry, .	513	3,770	19	12	—	—	4,314	3,200	—	—	3,260
Portrush, .	5	197	—	8	—	—	210	—	—	—	—
Rosslare, .	—	—	—	—	—	—	—	—	—	—	—
Sligo, .	891	134	1	2	1,026	73	2,127	1,965	—	—	1,965
Warrenpoint, .	—	—	—	—	—	—	—	—	—	—	—
Waterford, .	18,145	24,679	110	35	120	3,254	46,343	13,721	—	113	13,834
Westport, .	403	99	1	2	580	—	1,085	6,339	—	—	6,339
Wexford, .	—	—	—	—	—	—	—	—	—	—	—
TOTAL, .	118,799	145,975	11,583	7,469	3,427	18,299	305,552	107,169	4,678	2,285	114,132

TABLE

RETURN of the NUMBER of ANIMALS EXPORTED from IRELAND to GREAT
the PORTS of DEBARKATION

BRITISH PORTS.	CATTLE.							SHEEP.			
	Fat.	Stores (fatten- ing).	Milch Cows.	Spring- ers.	Other Cattle.	Calves.	Total.	Fat.	Stores.	Lambs.	Total.
Ardrossan, .	—	—	—	—	—	—	—	—	—	—	—
Ayr, .	2,614	14,227	221	421	—	57	17,540	151	46	—	197
Barrow, .	254	1,856	146	235	—	—	2,491	—	—	—	—
Bristol, .	1,001	14,059	153	239	—	2,824	18,276	2,081	99	—	2,180
Cardiff, .	—	—	—	—	—	—	—	—	—	—	—
Dover, .	—	—	—	—	—	—	—	—	—	—	—
Falmouth, .	—	—	—	—	—	—	—	—	—	—	—
Fishguard, .	6,101	17,398	873	1,447	—	5,015	31,434	6,358	741	434	7,533
Fleetwood, .	1,446	2,079	1,218	662	10	43	5,458	1,773	—	113	1,886
Glasgow, .	17,317	28,807	1,816	2,334	3,184	3,751	57,209	1,589	—	46	1,635
Greenock, .	5,070	7,458	55	141	12	86	12,822	80	950	—	1,030
Heysham, .	6,588	11,090	1,662	472	—	83	19,895	2,339	2,568	—	4,905
Holyhead, .	7,113	14,955	1,464	687	—	26	24,245	5,469	—	—	5,469
Liverpool, .	64,861	29,204	3,933	773	221	5,197	104,189	76,152	276	1,692	78,120
London, .	—	—	—	—	—	—	—	—	—	—	—
Manchester, .	6,348	448	37	—	—	—	6,833	11,177	—	—	11,177
Newhaven, .	—	—	—	—	—	—	—	—	—	—	—
Plymouth, .	—	—	—	—	—	—	—	—	—	—	—
Preston, .	—	—	—	—	—	—	—	—	—	—	—
Silloth, .	—	—	—	—	—	—	—	—	—	—	—
Southampton, .	—	—	—	—	—	—	—	—	—	—	—
Stranraer, .	86	4,394	5	58	—	617	5,160	—	—	—	—
Whitehaven, .	—	—	—	—	—	—	—	—	—	—	—
TOTAL, .	118,799	145,975	11,583	7,469	3,427	18,299	305,552	107,169	4,678	2,285	114,132

AND IMPORTS OF ANIMALS.

I.

BRITAIN during the Three Months ended 31ST DECEMBER, 1913, showing
IN IRELAND.

SWINE.			Goats.	HORSES.				Mules or Jennets	Asses.	Total Animals	IRISH PORTS.
Fat.	Stores.	Total.		Stal- lions.	Mares.	Geld- ings.	Total.				
3,509	—	3,509	2	—	—	—	—	—	—	6,605	Ballina.
3,941	1	3,942	—	11	489	830	1,330	1	3	65,211	Belfast.
3	—	3	—	—	7	11	18	—	—	156	Coleraine.
7,169	—	7,169	—	5	143	211	359	—	47	53,488	Cork.
721	31	752	6	2	17	23	42	—	—	27,709	Drogheda.
23,276	7	23,283	—	12	572	501	1,085	3	8	134,388	Dublin.
11,171	4	11,175	14	—	62	42	104	—	—	45,271	Dundalk.
10,001	74	10,075	—	10	1,285	882	2,177	—	2	32,012	Dundrum.
11	21	32	—	1	67	113	181	—	1	6,591	Greenore.
1	—	1	—	—	—	10	10	—	—	1,184	Larne.
648	35	683	12	—	9	22	31	—	5	33,489	Limerick.
128	—	128	—	—	—	—	—	—	—	154	Londonderry.
330	—	330	—	—	—	—	—	—	—	442	Millford.
804	—	804	—	—	—	—	—	—	—	8,378	Mulroy.
11	2	13	—	—	—	1	1	—	—	224	Newry.
10,546	33	10,579	4	—	—	2	2	—	—	14,677	Portrush.
10,865	—	10,865	1	17	827	936	1,780	—	4	72,827	Rosslare.
2,031	—	2,031	—	—	1	1	2	—	—	9,457	Sligo.
—	—	—	—	—	—	—	—	—	—	—	Warrenpoint.
—	—	—	—	—	—	—	—	—	—	—	Waterford.
—	—	—	—	—	—	—	—	—	—	—	Westport.
—	—	—	—	—	—	—	—	—	—	—	Wexford.
85,166	208	85,374	39	58	3,479	3,585	7,122	4	70	512,293	TOTAL.

II.

BRITAIN during the Three Months ended 31ST DECEMBER, 1913, showing
IN GREAT BRITAIN.

SWINE.			Goats.	HORSES.				Mules or Jennets	Asses.	Total Animals	BRITISH PORTS.
Fat.	Stores.	Total.		Stal- lions.	Mares.	Geld- ings.	Total.				
—	—	—	—	—	72	168	240	—	—	240	Ardrossan.
979	—	979	—	5	67	156	228	—	—	18,944	Ayr.
2,492	—	2,492	—	—	1	1	2	1	—	4,986	Barrow.
2,163	—	2,163	—	1	31	56	88	—	1	22,708	Bristol.
—	—	—	—	—	—	—	—	—	—	—	Cardiff.
—	—	—	—	—	—	—	—	—	—	—	Dover.
5,842	—	5,842	1	20	861	944	1,825	—	4	46,639	Falmouth.
146	—	146	—	5	241	260	506	—	—	7,996	Fishguard.
4,261	3	4,264	12	—	111	182	293	—	7	63,420	Fleetwood.
27	—	27	—	—	1	6	7	—	2	13,888	Glasgow.
3,628	35	3,663	—	2	277	344	623	—	2	29,088	Greenock.
21,391	74	21,465	—	14	1,410	1,011	2,435	1	2	53,617	Heysham.
43,694	75	43,769	26	10	298	310	618	2	49	226,773	Holyhead.
—	—	—	—	—	—	1	1	—	1	2	Liverpool.
543	—	543	—	—	32	15	47	—	—	18,600	London.
—	—	—	—	—	4	13	17	—	—	17	Manchester.
—	—	—	—	—	8	19	27	—	—	27	Newhaven.
—	—	—	—	—	—	—	—	—	—	—	Plymouth.
—	—	—	—	—	—	—	—	—	—	—	Preston.
—	—	—	—	—	17	17	34	—	1	35	Silloth.
—	21	21	—	1	48	82	131	—	1	5,313	Southampton.
—	—	—	—	—	—	—	—	—	—	—	Stranraer.
—	—	—	—	—	—	—	—	—	—	—	Whitehaven.
85,166	208	85,374	39	58	3,479	3,585	7,122	4	70	512,293	TOTAL.

TABLE

RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from GREAT
the PORTS OF

IRISH PORTS.	CATTLE.							SHEEP.			
	Fat.	Stores (fatten- ing).	Milch Cows.	Spring- ers.	Other Cattle.	Calves.	Total.	Fat.	Stores.	Lambs.	Total.
Ballina, .	—	—	—	—	—	—	—	—	20	—	20
Belfast, .	—	3	—	—	52	—	55	237	4,539	—	4,776
Coleraine, .	—	—	—	—	—	—	—	—	—	—	—
Cork, .	—	2	8	7	—	4	21	—	2	—	2
Drogheda, .	—	—	—	—	—	—	—	—	—	—	—
Dublin, .	—	1	—	—	—	14	15	—	881	1	882
Dundalk, .	—	—	—	—	—	—	—	—	—	—	—
Dundrum, .	—	—	—	—	—	—	—	—	—	—	—
Greenore, .	—	—	—	—	—	—	—	—	1	—	1
Larne, .	—	24	—	13	6	—	43	—	448	—	448
Limerick, .	—	—	—	—	—	—	—	—	—	—	—
Londonderry, .	—	—	2	—	—	2	4	—	322	2	324
Milford, .	—	—	—	—	—	—	—	—	3	1	4
Mulroy, .	—	—	—	—	—	—	—	—	—	—	—
Newry, .	—	—	—	—	—	—	—	—	186	—	186
Portrush, .	—	—	—	—	—	—	—	—	3	—	3
Rosslare, .	—	—	—	—	—	—	—	—	—	—	—
Silko, .	—	—	—	—	—	—	—	—	66	—	66
Warrenpoint, .	—	—	—	—	—	—	—	—	—	—	—
Waterford, .	—	9	—	—	—	—	9	—	10	—	10
Westport, .	—	—	—	—	—	—	—	—	—	—	—
Wexford, .	—	—	—	—	—	—	—	—	—	—	—
TOTAL, .	—	39	10	20	58	20	147	237	6,481	4	6,722

TABLE

RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from GREAT
the PORTS of EMBARKATION

BRITISH PORTS.	CATTLE.							SHEEP.			
	Fat.	Stores (fatten- ing).	Milch Cows.	Spring- ers.	Other Cattle.	Calves.	Total.	Fat.	Stores.	Lambs.	Total.
Ardroean, .	—	3	—	—	25	—	28	123	1,498	—	1,621
Ayr, .	—	—	—	—	1	—	1	114	2,821	—	2,935
Barrow, .	—	—	—	—	—	—	—	—	—	—	—
Bristol, .	—	—	—	1	—	—	1	—	—	—	—
Cardiff, .	—	—	—	—	—	—	—	—	—	—	—
Falmouth, .	—	—	—	—	—	—	—	—	—	—	—
Fishguard, .	—	9	8	6	—	4	27	—	9	—	9
Fleetwood, .	—	—	—	—	—	—	—	—	—	—	—
Glasgow, .	—	3	2	—	20	12	37	—	1,558	3	1,561
Greenock, .	—	—	—	—	—	—	—	—	222	—	222
Heysham, .	—	—	—	—	6	—	6	—	11	—	11
Holyhead, .	—	—	—	—	—	—	—	—	1	—	1
Liverpool, .	—	—	—	—	—	4	4	—	66	1	67
London, .	—	—	—	—	—	—	—	—	—	—	—
Manchester, .	—	—	—	—	—	—	—	—	—	—	—
Newhaven, .	—	—	—	—	—	—	—	—	—	—	—
Plymouth, .	—	—	—	—	—	—	—	—	—	—	—
Preston, .	—	—	—	—	—	—	—	—	—	—	—
Silloth, .	—	—	—	—	—	—	—	—	—	—	—
Southampton, .	—	—	—	—	—	—	—	—	—	—	—
Stenaer, .	—	24	—	13	6	—	43	—	295	—	295
Whitehaven, .	—	—	—	—	—	—	—	—	—	—	—
TOTAL, .	—	39	10	20	58	20	147	237	6,481	4	6,722

III.

BRITAIN during the Three Months ended 31ST DECEMBER, 1912, showing
DEBARKATION IN IRELAND.

SWINE.			Goats.	HORSES.				Mules or Jennets	Asses.	Total Animals	IRISH PORTS.
Fat.	Stores.	Total.		Stal- lions.	Mares.	Geld- ings.	Total.				
—	—	—	—	—	—	—	—	—	—	20	Ballina.
—	3	3	2	10	67	63	140	2	1	4,979	Belfast.
—	—	—	—	—	2	1	3	—	—	3	Coleraine.
—	—	—	—	53	170	81	304	—	—	327	Cork.
—	—	—	—	1	7	9	17	—	—	17	Drogheda.
—	4	4	—	10	73	62	145	—	—	1,046	Dublin.
—	—	—	—	1	3	—	4	—	—	4	Dundalk.
—	—	—	—	—	—	—	—	—	—	—	Dundrum.
—	—	—	—	8	258	156	422	—	—	423	Greenore.
—	—	—	1	7	7	7	21	—	—	513	Larne.
—	—	—	—	—	—	—	—	—	—	—	Limerick.
—	—	—	—	1	20	8	29	—	—	357	Londonderry.
—	—	—	—	—	—	—	—	—	—	4	Millford.
—	—	—	—	—	—	—	—	—	—	—	Mulroy.
—	—	—	—	—	—	—	—	—	—	186	Newry.
—	—	—	—	—	2	2	4	—	—	7	Portrush.
—	—	—	—	—	—	—	—	—	—	—	Rossare.
—	—	—	—	—	—	—	—	—	—	66	Silke.
—	—	—	—	—	—	—	—	—	—	—	Warrenpoint.
—	—	—	—	74	175	112	361	—	—	380	Waterford.
—	—	—	—	—	—	—	—	—	—	—	Westport.
—	—	—	—	—	—	—	—	—	—	—	Wexford.
—	7	7	3	165	784	501	1,450	2	1	8,332	TOTAL.

IV.

BRITAIN during the Three Months ended 31ST DECEMBER, 1913, showing
IN GREAT BRITAIN.

SWINE.			Goats.	HORSES.				Mules or Jennets	Asses.	Total Animals	BRITISH PORTS.
Fat.	Stores.	Total.		Stal- lions.	Mares.	Geld- ings.	Total.				
—	—	—	—	—	12	7	19	2	—	1,670	Ardrossan.
—	—	—	—	8	24	17	49	—	1	2,986	Ayr.
—	—	—	—	—	1	—	1	—	—	1	Barrow.
—	—	—	—	—	12	18	30	—	—	31	Bristol.
—	—	—	—	—	—	—	—	—	—	—	Cardiff.
—	—	—	—	—	—	—	—	—	—	—	Falmouth.
—	—	—	—	97	242	133	472	—	—	508	Fishguard.
—	—	—	2	3	14	12	29	—	—	31	Fleetwood.
—	2	2	—	3	16	27	46	—	—	1,646	Glasgow.
—	—	—	—	—	18	7	25	—	—	247	Greenock.
—	—	—	—	1	11	18	30	—	—	47	Heysham.
—	—	—	—	14	312	193	519	—	—	520	Holyhead.
—	5	5	—	5	28	39	72	—	—	148	Liverpool.
—	—	—	—	—	—	—	—	—	—	—	London.
—	—	—	—	—	3	1	4	—	—	4	Manchester.
—	—	—	—	—	—	—	—	—	—	—	Newhaven.
—	—	—	—	28	84	22	134	—	—	134	Plymouth.
—	—	—	—	—	—	—	—	—	—	—	Preston.
—	—	—	—	—	—	—	—	—	—	—	Silloth.
—	—	—	—	—	—	—	—	—	—	—	Southampton.
—	—	—	1	6	7	7	20	—	—	359	Stranraer.
—	—	—	—	—	—	—	—	—	—	—	Whitehaven.
—	7	7	3	165	784	501	1,450	2	1	8,332	TOTAL.

RETURN of the NUMBER of ANIMALS EXPORTED from IRELAND to the
showing the PORTS of

IRISH PORTS.	CATTLE.					SHEEP.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.
BELFAST, .	34	74	—	3	111	—	—	—
DUBLIN, .	—	—	—	—	—	—	—	—
TOTAL, .	34	74	—	3	111	—	—	—

RETURN of the NUMBER of ANIMALS EXPORTED from IRELAND to the
showing the PORTS of DEBARKATION

ISLE OF MAN PORT.	CATTLE.					SHEEP.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.
DOUGLAS, .	34	74	—	3	111	—	—	—

RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from the
showing the PORTS of

IRISH PORTS.	CATTLE.					SHEEP.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.
BELFAST, .	—	—	—	—	—	—	—	—
DUBLIN, .	—	—	—	—	—	—	—	—
TOTAL, .	—	—	—	—	—	—	—	—

RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from the
showing the PORTS of EMBARKATION

ISLE OF MAN PORT.	CATTLE					SHEEP.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.
DOUGLAS, .	—	—	—	—	—	—	—	—

ISLE OF MAN during the Three Months ended 31st December, 1913,
EMBARKATION in IRELAND.

SWINE.			Goats	HORSES.				Mules or Jennets.	Asses.	Total Animals.	IRISH PORTS.
Fat.	Stores.	Total.		Stallions	Mares.	Geldings	Total.				
—	—	—	—	—	—	—	—	—	—	111	BELFAST.
—	—	—	—	—	—	—	—	—	—	—	DUBLIN.
—	—	—	—	—	—	—	—	—	—	111	TOTAL

ISLE OF MAN during the Three Months ended 31st December, 1913,
in the ISLE OF MAN.

SWINE.			Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	ISLE OF MAN PORT.
Fat.	Stores.	Total.		Stallions	Mares.	Geldings	Total.				
—	—	—	—	|	—	—	—	—	—	111	DOUGLAS.

ISLE OF MAN during the Three Months ended 31st December, 1913,
DEBARKATION in IRELAND.

[illegible]

ISLE OF MAN during the Three Months ended 31st December, 1913,
in the ISLE OF MAN.

[illegible]

COASTING AND

RETURN OF THE NUMBER OF ANIMALS SHIPPED to and from Places in
the Places of Embarkation

IRISH PORTS.	CATTLE.					SHEEP.			SWINE.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.	Fat.	Stores.	Total.
Cork to Aghada Pier, .	—	—	—	—	—	—	—	—	—	—	—
" to Belfast, .	—	—	—	—	—	—	—	—	—	—	—
" to Spike Island, .	—	—	—	—	—	—	—	—	—	—	—
" to Queenstown, .	—	—	—	—	—	—	—	—	—	—	—
" to Waterford, .	—	—	—	24	24	—	—	—	—	—	—
Total, .	—	—	—	24	24	—	—	—	—	—	—
Aghada Pier to Cork, .	—	—	—	—	—	—	—	—	—	—	—
Belfast " .	—	—	—	—	—	—	—	—	—	—	—
Spike Island " .	—	—	—	—	—	—	—	—	—	—	—
Queenstown " .	—	—	—	—	—	—	—	—	—	—	—
Waterford " .	—	—	—	—	—	—	—	—	—	—	—
Total, .	—	—	—	—	—	—	—	—	—	—	—
Waterford to Ballyhack, .	—	49	—	26	75	—	—	—	—	—	—
" to Belfast, .	—	30	—	—	30	—	—	—	—	—	—
" to Duncannon .	—	89	2	13	104	—	—	—	—	—	—
Total, .	—	168	2	39	209	—	—	—	—	—	—
Ballyhack to Waterford, .	98	10	—	—	108	23	—	23	9	—	9
Dublin to Belfast, .	480	—	—	—	480	477	—	477	—	—	—
Duncannon to Waterford, .	32	1	1	—	34	80	—	80	153	—	153
Kilrush to Limerick, .	17	257	70	—	344	30	—	30	1,647	—	1,647
Kildysart " .	—	—	—	—	—	—	—	—	—	—	—
Glin, " .	—	—	—	—	—	—	—	—	5	—	5
Portumna, " .	—	—	—	—	—	—	—	—	250	—	250
Tarbert, " .	—	—	—	—	—	—	—	—	—	—	—
Kilkee, " .	—	—	—	—	—	—	—	—	—	—	—
Total, .	17	257	70	—	344	30	—	30	1,902	—	1,902
Londonderry to Milford, .	—	—	—	—	—	1	—	1	—	—	—
Belfast to Dublin, .	—	—	—	—	—	42	—	42	—	—	—
Londonderry to Moville, .	—	—	—	—	—	98	—	98	—	—	—
Moville to Londonderry, .	—	9	—	—	9	26	—	26	—	—	—
Ballina to Sligo, .	—	3	—	—	3	—	—	—	—	—	—
Belmullet " .	10	—	95	—	105	—	—	—	1,287	—	1,287
Westport " .	—	—	1	—	1	—	—	—	—	—	—
Total, .	10	3	96	—	109	—	—	—	1,287	—	1,287
Sligo to Belmullet, .	—	—	2	—	2	—	—	—	—	—	—
Milford to Mulroy, .	—	2	—	2	4	—	—	—	6	2	8
Sligo to Ballina, .	—	—	—	—	—	—	—	—	—	—	—
Belfast to Waterford, .	—	—	—	—	—	—	—	—	—	—	—
Leitbeg to Mulroy, .	—	—	—	—	—	—	—	—	—	—	—
Total, .	637	450	171	65	1,323	777	—	777	3,357	2	3,359

INLAND NAVIGATION.

Ireland during the Three Months ended 31st DECEMBER, 1913, showing and Debarkation.

Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	IRISH PORTS.
	Stallions.	Mares.	Geldings.	Total.				
—	—	—	—	—	—	—	—	Cork to Aghada Pier.
—	—	—	—	—	—	—	—	to Belfast.
—	—	—	—	—	—	—	—	to Spike Island.
—	—	—	—	—	—	—	—	to Queenstown.
—	—	—	—	—	—	—	24	to Waterford.
—	—	—	—	—	—	—	24	Total.
—	—	—	—	—	—	—	—	Aghada Pier to Cork.
—	—	—	—	—	—	—	—	Belfast
—	—	—	—	—	—	—	—	Spike Island "
—	—	—	—	—	—	—	—	Queenstown "
—	—	—	—	—	—	—	—	Waterford "
—	—	—	—	—	—	—	—	Total.
—	—	2	—	2	—	—	77	Waterford to Ballyhack.
—	1	5	2	8	—	—	38	to Belfast.
—	—	—	1	1	2	2	109	to Duncannon.
—	1	7	3	11	2	2	224	Total.
—	—	—	—	—	—	—	140	Ballyhack to Waterford.
—	—	1	4	5	—	—	962	Dublin to Belfast.
—	—	—	1	1	—	—	268	Duncannon to Waterford.
—	—	22	8	30	—	—	2,051	Kilrush to Limerick.
—	—	—	—	—	—	—	—	Kildysart "
—	—	—	—	—	—	—	5	Glin "
—	—	—	—	—	—	—	250	Portumna "
—	—	—	—	—	—	—	—	Tarbert "
—	—	—	—	—	—	—	—	Kilkee "
—	—	22	8	30	—	—	2,306	Total.
—	—	—	—	—	—	—	1	Londonderry to Milford.
—	—	—	—	—	—	—	42	Belfast to Dublin.
—	—	—	—	—	—	—	98	Londonderry to Moville.
—	—	—	—	—	—	—	35	Moville to Londonderry.
—	—	—	—	—	—	—	3	Ballina to Sligo.
—	—	—	—	—	—	—	1,392	Belmullet "
—	—	—	—	—	—	—	1	Westport "
—	—	—	—	—	—	—	1,396	Total.
—	—	—	—	—	—	—	2	Sligo to Belmullet.
—	—	—	—	—	—	—	12	Milford to Mulroy.
—	—	—	—	—	—	—	—	Sligo to Ballina.
—	—	—	1	1	—	—	1	Belfast to Waterford.
—	—	—	—	—	—	—	—	Leitbeg to Mulroy.
—	1	30	17	48	2	2	5,511	Total

RETURN of the NUMBER of HORSES EXPORTED from IRELAND through GREAT BRITAIN to the COLONIES and FOREIGN COUNTRIES during the THREE MONTHS ended 31st DECEMBER, 1913, showing the Ports of Embarkation in Ireland.

PORTS.	Number of Horses.			
	Stallions.	Mares.	Geldings.	Total.
Belfast,	2	198	191	391
Cork,	—	—	—	—
Dublin,	—	77	56	133
Dundalk,	—	38	22	60
Greenore,	1	694	429	1,124
Waterford,	1	243	181	425
Wexford,	—	—	—	—
Total,	4	1,250	879	2,133

RETURN of the NUMBER of HORSES IMPORTED into IRELAND through GREAT BRITAIN from the COLONIES and FOREIGN COUNTRIES during the THREE MONTHS ended 31st DECEMBER, 1913, showing the Ports of Debarkation in Ireland.

PORTS.	Number of Horses.			
	Stallions.	Mares.	Geldings.	Total.
Belfast,	—	—	—	—
Dublin,	—	—	—	—
Wexford,	—	—	—	—
Total,	—	—	—	—

RETURN of the NUMBER of HORSES EXPORTED from IRELAND direct to FOREIGN COUNTRIES during the THREE MONTHS ended 31st DECEMBER, 1913, showing the Ports of Embarkation in Ireland.

PORTS.	Number of Horses.			
	Stallions.	Mares.	Geldings.	Total.
Cork,	—	94	163	257
Limerick,	—	—	—	—
Total,	—	94	163	257

DISEASES OF ANIMALS IN IRELAND.

NUMBER OF OUTBREAKS of SWINE FEVER, and NUMBER of SWINE returned as having been SLAUGHTERED in Ireland, under the Diseases of Animals Act of 1894, in the undermentioned period, by Order of the Department.

Quarter ended	SWINE FEVER.	
	Outbreaks confirmed.	Swine Slaughtered as Diseased or as having been Exposed to Infection.
31st December, 1913,	17	224

NUMBER of OUTBREAKS reported as having taken place, and NUMBER of ANIMALS returned as having been Attacked by ANTHRAX and GLANDERS in Ireland in the undermentioned period.

Quarter ended	ANTHRAX.		GLANDERS (including Farcy).		Foot and Mouth Disease.	
	Outbreaks Reported	Animals Attacked	Outbreaks Reported.	Animals Attacked.	Outbreaks Reported.	Animals Attacked.
31st Dec., 1913,	—	—	1	1	—	—

NUMBER of CASES of RABIES in DOGS in IRELAND during the undermentioned period.

Quarter ended	Number of Cases.
31st December, 1913,	—

NUMBER of OUTBREAKS reported as having taken place, and NUMBER of ANIMALS returned as having been attacked by SHEEP-SCAB and PARASITIO-MANGE in Ireland in the undermentioned period.

Quarter ended	SHEEP-SCAB.		PARASITIO-MANGE.	
	Outbreaks Reported.	Sheep Attacked.	Outbreaks Reported.	Animals Attacked.
31st Dec., 1913,	170	1617	11	13

Veterinary Branch,
Department of Agriculture and Technical Instruction
for Ireland, Dublin.

ACCOUNT showing the QUANTITIES of certain kinds of AGRICULTURAL
into Ireland during each WEEK

ARTICLES	WEEK ENDED				
	4th October	11th October	18th October	25th October	1st November
ANIMALS LIVING—					
Horses, No.	—	—	—	—	—
FRESH MEAT—					
Beef (including refrigerated and frozen), cwt.	—	3,832	—	—	—
Mutton, " " " "	—	1,340	—	—	—
Pork, " " " "	—	—	—	—	—
Unenumerated, " " " "	—	70	—	—	—
SALTED OR PRESERVED MEAT—					
Bacon, cwt.	47	—	60	71	—
Beef, " " " "	—	—	—	—	—
Hams, " " " "	—	—	—	—	—
Pork, " " " "	—	400	38	—	327
Meat, unenumerated, Salted " " " "	—	—	—	—	—
Meat, preserved otherwise than by salting (including tinned and canned), cwt.	—	—	—	—	32
DAIRY PRODUCE AND SUBSTITUTES—					
Butter, cwt.	—	—	—	—	—
Margarine, " " " "	241	140	219	214	190
Cheese, " " " "	2	—	—	654	823
Milk, Condensed, " " " "	51	65	7	206	80
" Cream, " " " "	—	—	—	—	—
" Preserved, other kinds " " " "	—	—	—	—	—
EGGS, gt. hunds.	144	448	1,176	—	—
LARD, cwt.	—	8	—	80	8
CORN, GRAIN, MEAL AND FLOUR—					
Wheat, cwt.	—	61,900	64,100	113,900	124,600
Wheat, Meal and Flour, " " " "	—	19,100	1,600	33,300	89,400
Barley, " " " "	—	—	47,600	111,900	187,300
Oats, " " " "	—	—	—	—	—
Peas, " " " "	—	300	600	40	70
Beans, " " " "	—	140	1,360	1,000	1,180
Maize, or Indian Corn, " " " "	453,000	390,900	388,200	209,500	51,500
FRUIT, RAW—					
Apples, " " " "	11	29	100	—	—
Currants, " " " "	—	—	—	—	—
Gooseberries, " " " "	—	—	—	—	—
Pears, " " " "	80	27	—	8	—
Plums, " " " "	—	—	—	—	—
Grapes, " " " "	—	—	—	—	—
Lemons, " " " "	—	—	—	—	—
Oranges, " " " "	—	—	—	—	—
Strawberries, " " " "	—	—	—	—	—
Unenumerated, " " " "	—	—	—	—	—
HAY, tons,	—	—	—	—	—
STRAW, " " " "	—	—	—	—	—
MOSS LITTER, " " " "	10	20	35	30	—
HOPS, cwt.	—	—	—	—	—
VEGETABLES, RAW—					
Onions, bushels,	3,540	538	2,908	160	375
Potatoes, cwt.	—	—	—	—	—
Tomatoes, " " " "	—	37	—	—	—
Unenumerated, " " " "	6	—	23	—	18
VEGETABLES, DRIED, cwt.	—	—	—	—	—
Preserved by Canning, " " " "	14	—	—	—	—
POULTRY AND GAME, £	—	—	—	—	—

*This Table is confined to the Imports of certain kinds of Agricultural Produce into
to a request from this Department kindly consented to separate the Irish Imports (direct)
form of Weekly Returns

SUMMER HERRING

No.	Collecting Station.	Ports or Creeks from which the Fishing was carried on.	Places at which the Boats discharged their Fish.	Date when Fishing may be said to have Commenced.
1	Howth, . . .	Howth, . . .	Howth, . . .	4th June, . .
2	Dunmore East, . .	Dunmore East, . .	Dunmore East, . .	2nd May, . .
3	Helvick Head, . .	Ballinagoul, . .	Dungarvan, . .	14th May, . .
4	Upper Cove, . .	Kinsale, . .	Kinsale, . .	24th May, . .
5	Union Hall, . .	Union Hall & Glandore, . .	Union Hall, . .	6th June, . .
6	Baltimore, . .	Baltimore, . .	Baltimore, . .	12th June, . .
7	Bantry, . .	Bantry and Whiddy, . .	Bantry, . .	August, . .
8	Castletownbere, . .	Castletownbere, Whitehorse, Gurnakilla and Gearhies, . .	Castletownbere and Gearhies . .	June, . .
9	Waterville, . .	Ballinskelligs, Rineen, and Rath, . .	Ballinskelligs, Rineen and Rath, . .	August, . .
10	Knightstown, . .	Valentia Harbour, . .	Valentia Harbour, . .	2nd September, . .
11	North Aran, . .	Kilronan, Killeany, and Kilmurvy, . .	Kilronan, . .	28th May, . .
12	Galway, . .	Galway, . .	Galway, . .	1st May, . .
13	Cleggan, . .	Cleggan and Inishboffin Island, . .	Cleggan and Inishboffin . .	13th May, . .
14	Keel, . .	Keel, Keem and Dooagh, . .	Keel, Keem and Dooagh, . .	10th September, . .
15	Blacksod Point, . .	Inishkeen, Achill, and Blacksod Bay, . .	Blacksod Pier, . .	13th May, . .
16	Ballyglass, . .	Ballyglass, Tip, Muineena, Glenlara and Inver, . .	Ballyglass and Blind Harbour, . .	August, . .
17	Belderrig, . .	Rinroe, . .	Rinroe, . .	28th May, . .
18	Ross, . .	Kilcummin, Rathfran, and Castlemaghee, . .	Ballina, . .	September, . .
19	Mullaghmore, . .	Mullaghmore, . .	Mullaghmore, . .	7th May, . .
20	Killybegs, . .	Killybegs, . .	Killybegs, . .	15th May, . .
21	Burtonport, . .	Burtonport, . .	Burtonport, . .	1st May, . .
22	Inishboffin, . .	Tory Island, . .	Tory Island & Magheraroarty, . .	22nd May, . .
23	Mulroy, . .	Downings, . .	Downings Pier, . .	7th May, . .
24	Buncrana, . .	Buncrana, . .	Buncrana, . .	1st May, . .
25	Ballycastle, . .	Ballycastle, Port Bradon, and Ballintoy, . .	Ballycastle, Port Bradon, and Ballintoy, . .	May, . .
26	Portavogie, . .	Portavogie, . .	Portavogie, . .	May, . .
27	Portaferry, . .	Strangford, Kilclief, Killyleagh, Ardmullen, Portaferry, and Kircubbin, . .	Strangford, Killyleagh, Ardmullen, Portaferry, and Kircubbin, . .	4th June, . .
28	Ardglass, . .	Ardglass, . .	Ardglass, . .	1st May, . .
29	Annalong, . .	Annalong Harbour, . .	Annalong, . .	June, . .
30	Kilkeel, . .	Kilkeel, Derryogue, Leestone, Ballykeel, and Blackrock, . .	Kilkeel, . .	14th May, . .
31	Dundalk, . .	Giles Quay and Dundalk, . .	Giles Quay and Dundalk, . .	September, . .
32	Blackrock, . .	Blackrock, . .	Blackrock, . .	September, . .
33	Clogher Head, . .	Clogher Head, . .	Clogher Head, . .	23rd May, . .
34	Skerries, . .	Skerries, . .	Skerries, . .	1st May, . .

FISHERY, 1913 (TABLE No. 1).

Date when Fishing may be said to have ended	Quantity landed.	Value.	Quantity Cured for Exportation.	Quantity Sold for Local Consumption.	Quantity despatched to other Markets for Sale as Fresh Fish.	No.
31st October.	Cwts. 60,974	£ s. d. 19,042 13 8	Barrels. 7,195 Bls., 2,686 Half Bls., also 8,000 boxes kippered	—	Balance	1
31st October.	2,295½	808 6 6	—	One-sixth,	Balance	2
9th August,	1,276	642 12 6	—	All,	—	3
11th October,	1,457	406 15 0	150	One-thirtieth	Balance	4
2nd July,	517	105 4 0	60	—	Balance	5
11th July,	1,126½	207 11 9	36 & 107 Half Bls.	3 crans,	Balance	6
31st October,	1,554	622 15 0	40	Four-fifteenth	Balance	7
October,	1,301	435 12 6	361	—	Balance	8
October,	1,220	610 0 0	—	One-ninth,	Balance	9
12th Sept.,	445	133 10 0	—	—	All	10
31st October,	3,219	1,318 1 7	274 Bls. & 1,076 Half Bls.	—	Balance	11
31st October,	4,869½	2,026 12 0	—	All,	—	12
3rd October.	2,380	600 0 0	490, and 555 Half Brls.	30 hds.,	Balance	13
29th October,	319	106 8 0	—	All,	—	14
24th October,	633	320 8 6	10, & 305 Half Bls.	—	—	15
31st October,	340	119 0 0	—	All,	—	16
25th October.	340	120 0 0	120	—	—	17
October,	270	250 0 0	—	All,	—	18
23rd October.	256½	118 0 8	—	All,	—	19
30th October.	1,716	817 18 6	229	One-tenth,	Balance	20
31st October,	570	291 7 0	108	One-eighth,	Balance	21
21st October,	2,345	840 0 0	400	Balance,	—	22
21st October,	6,677	3,824 12 7	2,472	20 crans,	Balance	23
11th June,	7,084	5,958 15 6	2,815	—	—	24
October,	1,415	420 7 6	—	All,	—	25
31st July,	4,373	1,629 17 0	—	All,	—	26
24th October,	1,100	440 0 0	—	One-eighth,	Balance	27
20th Sept.,	80,135	37,324 8 6	22,500	98 crans,	Balance	28
31st October,	3,947	1,288 11 6	950	—	—	29
31st October,	27,246½	8,591 3 0	3,025	One-ninth	Balance	30
31st October,	400	175 0 0	—	All,	—	31
October,	362	164 5 6	—	All,	—	32
30th Sept.,	3,710½	1,422 16 6	750	—	Balance	33
31st October,	403	156 0 6	—	Two-ninths,	Balance	34
TOTALS,	226,276½	91,638 15 3	41,985 Bls. 4,729 Half Bl. 8,000 Boxes Kipperd,			

SUMMER HERRING FISHERY, 1913 (TABLE NO. 1.—*con.*)

No.	Collecting Station.	Places where the Herrings were Cured.	Month in which greatest Quantity was captured.	Number of Steam Drifters that fished from Ports within this Station.	Number of Irish Row Boats using Seinc or Ring Nets	Number of Motor Drifters that fished.
1	Howth,	West and East Piers, Howth,	July,	4	—	43
2	Dunmore East,	—	June,	1	—	4
3	Helvick Head,	—	June,	—	—	—
4	Upper Cove,	Kinsale	June,	—	—	—
5	Union Hall,	Union Hall,	June,	—	—	—
6	Baltimore,	Baltimore,	June,	—	—	1
7	Bantry,	Bantry Quay,	October,	—	3	—
8	Castletownbere,	Bantry, Gearhies and Castletownbere,	October,	—	—	—
9	Waterville,	—	September,	—	10	—
10	Knightstown,	—	September,	—	—	—
11	North Aran,	Kilronan,	September,	—	—	—
12	Galway,	—	October,	—	—	1
13	Cleggan,	Cleggan and Inish-boffin	July,	—	12	—
14	Keel	—	October,	—	—	—
15	Blacksod Point,	Blacksod Pier,	June,	—	—	2
16	Ballyglass,	—	October,	—	—	—
17	Belderrig,	Rinroe,	June,	—	—	—
18	Ross,	—	September,	—	—	—
19	Mullaghmore,	—	July,	—	—	—
20	Killybegs,	Killybegs,	October,	—	1	7
21	Burtonport,	Burtonport,	October,	—	—	2
22	Inishboffin,	Tory Island,	May,	—	9	—
23	Mulroy,	Downings,	September,	21	—	8
24	Buncrana,	Buncrana,	May,	57	—	2
25	Ballycastle,	—	July,	—	6	—
26	Portavogie,	—	July,	—	—	8
27	Portaferry,	—	July,	—	3	—
28	Ardglass,	Ardglass,	August,	43	—	41
29	Annalong,	Annalong,	August,	—	—	—
30	Kilkeel,	Kilkeel,	August,	—	—	6
31	Dundalk,	—	September,	—	—	2
32	Blackrock,	—	September,	—	—	2
33	Clogher Head,	Clogher Head,	August,	—	—	1
34	Skerries,	—	—	—	—	—

. SUMMER HERRING FISHERY, 1913—(TABLE No. 2.)

Herrings were also landed at the places set forth below, which are not included in the foregoing Return.

Collecting Station.	Places where Landed.	Quan- tity.	Value.		
		Cwts.	£	s.	d.
Kingstown, . . .	Kingstown,	48	22	7	6
Bray,	Bray,	4	2	0	0
Arklow	Arklow	124	61	10	0
Courtown,	Courtown and Cahore, . . .	2½	2	0	0
Wexford,	Wexford,	37	32	10	0
Rosslare,	Rosslare,	132	132	5	0
Arthurstown	Passage East,	1½	0	12	0
Ballinacourty, . . .	Dungarvan,	10	3	5	0
Youghal,	Youghal,	72	28	16	6
Ballycotton,	Ballycotton,	192½	81	15	0
Queenstown,	Queenstown,	227	90	16	0
Rathcoursey,	Rathcoursey,	62	31	19	0
Oyster Haven,	Oyster Haven,	4	2	5	0
Ballyally,	Trilispun,	15	7	10	0
Schull,*	Schull, Kitchen Cove, and Dun- manus	210½	104	1	0
Crookhaven,	Crookhaven,	52½	16	16	6
Ballycrovane,	Ardgroom, Kilcatherine and Col- lorus	50	12	10	0
Lackeen,	Rossdohan,	2	1	10	0
Dingle,	Dingle,	40	24	11	0
Dunquin,	Dunquin and Cooscroum, . . .	110	66	6	0
Tarbert	Beale Bar and Ballylongford, . .	132	105	0	0
Cappa,	Kilrush,	9	3	0	0
Farrahy,	Farrahy,	½	0	9	0
Ballaghaline,	Ballaghaline,	½	0	9	0
South Aran,	Inishere,	2	0	15	0

*60 barrels were cured at Schull.

SUMMER HERRING FISHERY, 1913—(TABLE NO. 2.—*con.*)

Collecting Stations.	Places where Landed.	Quantity.	Value.
		Cwts.	£ s. d.
Costello Bay, . .	Costello Bay and Rossavele . .	55	35 0 0
Roundstone, . .	Roundstone,	11½	10 1 5
Rosmoney, . .	Curraun and Mallaranny, . .	40	17 0 0
Elly Bay, . .	Scotchport,	2	2 0 0
Belmullet, . .	Belmullet,	31	20 5 0
Teelin,* . .	Teelin and Cladnageragh, . .	72½	27 18 0
Kincasslagh,† . .	Gortnasate Pier,	194	107 6 0
Bunbeg, . .	Bunbeg,	47½	12 14 0
Dunfanaghy, . .	Dunfanaghy and Portnablagh, . .	160	62 3 6
Londonderry, . .	Londonderry,	3	0 12 0
Cushendall, . .	Waterfoot, Cushendall and Cushendun	200	90 0 0
Portmuck, . .	Portmuck,		1 0 0
Newcastle, . .	Newcastle,	23	12 0 0
Greenore, . .	Carlingford and Whitestown . .	32	16 0 0
Annagassen, . .	Annagassen,	52½	25 15 0
Balbriggan, . .	Balbriggan,	95	57 3 0
Rush, . .	Rush,	82	35 15 0
	TOTAL, . .	2,644	1,370 11 5

* 33 half barrels were cured at Teelin.

† 72 barrels were cured at Kincasslagh.

EMIGRATION FROM IRELAND.

TABLE showing, by Destinations, the Numbers of Emigrants (Natives of Ireland) who left the Ports of Ireland during the months of October, November and December, 1913, and the total for the Twelve Months ended the 31st December, 1913, together with the total Number of Emigrants in each of the corresponding periods of the year 1912.

DESTINATION.	October, 1913.	November, 1913.	December, 1913.	Twelve Months ended 31st Dec., 1913.
FOREIGN COUNTRIES AND THE COLONIES :—				
America (U.S.),	2,342	757	226	21,758
Canada,	416	172	43	6,673
South Africa,	25	12	12	214
Australia,	84	73	57	915
New Zealand,	16	37	16	220
Other Countries,	1	8		38
Total,	2,884	1,059	354	29,818
GREAT BRITAIN :—				
England and Wales,	74	80	74	911
Scotland,	21	12	3	238
Total,	95	92	77	1,149
General Total, 1913,	2,979	1,151	431	30,967
General Total, 1912,	3,129	1,274	472	29,344

The figures in the above Table have been abstracted from the monthly Return published by the Registrar-General for Ireland.

The figures are subject to revision in the Annual Report

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Vol. XIV.

No. 3.

DEPARTMENT OF AGRICULTURE
AND
TECHNICAL INSTRUCTION FOR IRELAND.

JOURNAL.

Investigations on Potato Diseases—Live Stock Feeding Experiments—
Sugar Beet Experiments—Rural Life Congress in Belgium—Foul
Brood or Bee Pest—The Composition of Cheese—Technical Instruction
in Navan—Flax Experiments in 1912—Marketing Wild Fruits—Celery
Leaf-Spot Disease or Blight—Second Irish Egg-Laying Competition—
Winter Egg Records—Official Documents—Notes and Memoranda—
Statistical Tables.

FOURTEENTH YEAR

No. 3

APRIL, 1914.



DUBLIN :

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1914.

PRICE SIXPENCE

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NOTICE.

Communications respecting the literary contents of this JOURNAL should be addressed to the Superintendent of the Statistics and Intelligence Branch, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion-street, Dublin.

Communications respecting Advertisements should be addressed to ALEX. THOM & CO. (LIMITED), MIDDLE ABBEY-STREET, DUBLIN; or to LAUGHTON & CO. (LIMITED), 3 WELLINGTON-STREET, STRAND, LONDON, W.C., and not to the DEPARTMENT OF AGRICULTURE AND TECHNICAL INSTRUCTION FOR IRELAND.

INVESTIGATIONS ON POTATO DISEASES

(FIFTH REPORT.)

The investigations on potato diseases commenced in 1909 at the temporary station at Clifden, Co. Galway, were continued during the season of 1913. Illustrated reports of the work done in previous seasons will be found in Vols. X., XI., XII., XIII. of this JOURNAL at pp. 241, 417, 334, and 445 respectively.

The amount of land available for tillage operations at this station is comparatively limited, and during the past few years most of it has already been under potatoes while some of it has been continuously cropped with them. It therefore became necessary to find accommodation for some of the field experiments elsewhere, and although the station has remained the headquarters of the work with which the present report deals, a considerable amount of it, more particularly that connected with spraying, has been carried out further afield, but still mainly in the West of Ireland.

One of the localities selected was on the farm of Mr. J. Ward, at Cushatrough, about six miles from Clifden, while another was at the Department's Agricultural Station at Athenry, Co. Galway. Experiments connected with the blight and the stalk disease were also carried out under the supervision of the Department's Assistant Agricultural Overseers at a large number of centres throughout practically the whole of the West of Ireland while a few experiments were also arranged for at the Department's Agricultural Station at Clonakilty, Co. Cork, at the Albert Agricultural College, Glasnevin, Co. Dublin, and on one or two farms in Co. Down.

In spite of a cold and wet spring, which in many cases greatly delayed planting and checked early growth, the season of 1913 was an exceptionally favourable one for potatoes, and the crop in Ireland was one of the best known for many years past.

The following are the diseases to which particular attention was paid :—

I.—THE ORDINARY BLIGHT.

(*Phytophthora infestans* de Bary.)

Whilst in 1912 the appearance of the blight in Ireland was recorded as early as the 20th of May, in 1913 its presence was not noted until June 3rd, a case of it being found on that date in Co. Cork. At about the same date another case was observed in the same county in potatoes which had been planted as early as January 24th. It appeared on a single plant in one of the Clifden plots on June 7th, and during the following fortnight further cases were recorded from various localities chiefly in the West.

The reports of these early cases of the blight are mainly the outcome of the alertness of the Department's Assistant Agricultural Overseers in the various districts and they are of importance in enabling the Department to issue timely reminders as to the necessity for starting spraying operations in the districts concerned.

The experiments carried out in 1913 connected with the blight were mainly concerned with spraying and were very similar in scope to those of previous years. Thus such matters as the best time to spray, the best method of application of the spray, the strength of the mixture and the efficiency of certain proprietary spraying materials have all received attention and the results will now be discussed. It may be stated at once that the season taken as a whole was not favourable to an extensive development of the blight, and in this respect was a great contrast to that of 1912. This fact must be borne in mind when considering the results of the spraying experiments.

The results of experiments carried out during the previous seasons have not been such as to make it possible to

When to Spray. make any very definite statement as the exact times when spraying should be carried out.

In some seasons better results appear to be obtained by slightly delaying spraying operations, in others by carrying them out at an early date. The weather conditions undoubtedly play a very important part in the matter, but, as was pointed out in the last report, the results obtained at Clifden have also been influenced by the prevalence there of the stalk disease, in addition to the blight. During the past season this disturbing factor had not to be reckoned with, seeing that in the plots at Athenry the stalk disease was not present nor was it so to any serious extent in those at Cushatrough.

At Athenry each plot consisted of three drills of one square perch each in area and each plot was duplicated, the corresponding plots being at some considerable distance apart in the same field, the soil conditions over the whole area employed for the plots (about one statute acre) being very uniform. In taking results each drill was weighed separately and the yield of the plot was calculated from the average of the three drills. The yields given in the accompanying table are the means of two plots in each case. As regards cultivating and manuring the plots were treated alike, and no results were taken from marginal plots. The variety of potato used was Up-to-date. Spraying was done both with Bordeaux and Burgundy mixtures and was started at three distinct times, which may be designated as "early," "normal," and "late." The first spraying for "early" was carried out on June 28th, for "normal" on July 10th, and for "late" on July 25th. The "early" and "normal" plots were sprayed three times at intervals of twenty-one

days, the "late" plots received no third spraying seeing that the plants in them were practically all dead when the time for it arrived.

The results are summarised in the following table, the yields being expressed in tons per statute acre :—

Spraying Mixture.	Strength used.	Early.		Normal.		Late.	
		Total Yield.	Per-centage Blighted.	Total Yield.	Per-centage Blighted.	Total Yield.	Per-centage Blighted.
Bordeaux .	2%	12.1	10.7	11.0	5.2	6.4	4.8
Burgundy .	2%	11.5	8.1	12.0	7.1	6.1	10.2
Bordeaux .	1%	9.2	5.7	11.8	8.4	—	—
Burgundy .	1%	10.1	12.8	11.9	9.1	—	—
Averages .		10.7	9.3	11.7	7.4	6.3	7.5

The most striking fact revealed by an examination of this table is the very decided diminution in yield due to delaying the first spraying till so late a date as July 25th. The plots in question were left until the blight was evident on the potato "tops" to an extent sufficiently well marked to be noticeable on a more or less casual glance. Many farmers unfortunately delay spraying for the first time until the blight has reached this stage and the experiment clearly shows, as it was anticipated it would, the disastrous results which may follow therefrom.

If the results of the "early" and "normal" spraying be examined and the yields of healthy tubers be calculated in each case it will be found on comparing them that there is an increase of over one ton of healthy tubers per statute acre in favour of the "normal" spraying. This is explained by the fact that although the blight appeared comparatively early the weather conditions then were unfavourable to its rapid spread. During the latter part of August and the early part of September, however, these conditions changed and the blight made considerable headway. The "early" plots received their third and last spraying on August 9th, while the "normal" plots received it on August 21st, so that the latter were better protected at a time when the blight was spreading owing to wet weather. Had the "early" plots received a fourth spraying they would probably have given better results than the "normal" plots.

This result bears out the experiences of former seasons in which it has been found that those plots have given the best results which received one of their sprayings just before the advent of unfavourable weather. Since these conditions cannot be foreseen it is impossible

to lay down any rule of universal application as to the dates on which potatoes may be sprayed to obtain the maximum advantages.

At Cushatrough the results were on the whole similar to those at Athenry, but here the attack of blight was much less severe and from twenty-five plots only eight tubers affected with blight were obtained. Three sprayings were given in each case, the first applications being respectively "early," starting on June 20th, "normal," on July 4th, and "late" on July 18th. The best yield, 12·05 tons per st. acre, was obtained on the "normal" plots, the "late" plots gave 10·25, and the "early" 10 tons per acre respectively. Owing to the comparatively slow development of the blight at Cushatrough it was quite possible to give the "late" plots there a third spraying, on September 2nd, and this accounts for the fact that these plots do not show the great diminution in yield experienced on the corresponding plots at Athenry which could only be sprayed twice.

Both at Athenry and at Cushatrough plots were laid down for the purpose of comparing the relative efficiencies **Strength of Mixture.** of mixtures of different strengths. The mixtures were made up in accordance with the instructions provided in the Department's Leaflet No. 14. The ordinary or normal mixtures were made up with a two per cent. solution of copper sulphate and the requisite quantities of lime or soda, and against these were tested mixtures made with only one per cent. of copper sulphate and the proportionate quantity of lime or soda. In previous seasons experience had shown that in some cases a one per cent. mixture was practically as efficacious as two per cent., while in others the two per cent. mixture was the better. The results obtained this season on the Athenry plots are tabulated below, the yields being expressed in tons per statute acre.

Mixture Employed.	Time of Application	2% Solution.		1% Solution.	
		Total Yield.	Percentage Blighted.	Total Yield.	Percentage Blighted.
Burgundy .	Normal .	11·5	8·1	10·1	12·8
Do. .	Late .	12·0	7·1	11·9	9·1
Bordeaux .	Normal .	12·1	10·7	9·2	5·7
Do. .	Late .	11·0	5·2	11·8	8·4
Averages .	. .	11·65	7·77	10·75	9·0

It will be seen that on the average both a higher total yield and a lower percentage of blighted tubers were obtained by using the ordinary two per cent. mixture. The results on the Cushatrough plots confirm these results although the differences in yield are not so great. On them, as previously stated, there were practically no blighted tubers, but the total yield with the normal, two per cent. mixture was at the rate of 12.75 tons per statute acre as against 12.64 tons with the one per cent. mixture.

Before the advent of special machines spraying mixtures were applied by means of a heather broom or other **Upwards or Down-wards Spraying?** similar contrivance. This was of course a method which was wasteful in material and which resulted in the mixtures being applied chiefly to the upper surfaces of the leaves. Nevertheless fairly good results were obtained. By judicious manipulation or adjustment of the nozzles of spraying machines it is, however, possible to distribute the spray, more or less in an upward manner, so that it becomes fairly uniformly distributed over the whole plant including both upper and lower leaf surfaces. It is of course easier even with a machine merely to spray downwards on to the top of the foliage than to endeavour to cover the whole plant with the spray, and the question arises, given the same amount of material, which method of application is the more profitable?

The experiments conducted at Clifden in 1912 did not permit of any conclusive answer being given to this question, and, indeed, in order to obtain reliable data on the matter experiments carried on over a number of seasons will be necessary.

Some very interesting results have been obtained during the past two seasons from experiments conducted in the West of Ireland by the Department's Assistant Agricultural Overseers. Thus in 1912 experiments were made at twenty-six centres, and in twenty-one cases the yield of healthy tubers was greater when both leaf surfaces were covered with the spray, while the reverse was the case in the five other instances. In 1913 similar tests were made at forty-four centres with the result that in thirty-one cases the yield was greater when both surfaces were sprayed, while in the other thirteen a greater yield was obtained when the spraying was only done in a downward direction.

A summary of the average yields in tons per statute acre with the percentage yield of blighted tubers is given in the following table, and it will be found on making the necessary calculation that the average gain due to spraying both surfaces was 1.4 tons per acre in 1912, a year in which the blight was severe, and about half this quantity in 1913, a season in which this was not the case.

Mode of Application of Spray.	1912		1913	
	Total Yield.	Percentage Blighted.	Total Yield.	Percentage Blighted.
Downwards (Upper Surface).	10.05	10.44	10.19	3.06
Upwards (Both Surfaces).	11.25	7.55	10.75	2.4

The results obtained from a series of eight plots at Athenry in 1918 designed to test this matter are given in the following table, the yields being given in tons per statute acre.

Mode of Application of Spray.	Burgundy Mixture.		Bordeaux Mixture.	
	Total Yield.	Percentage Blighted.	Total Yield.	Percentage Blighted.
Downwards (Upper Surface).	11.59	8.62	12.63	11.79
Upwards (Both Surfaces).	11.47	8.03	12.12	10.72

Here it will be seen that the percentage of blighted tubers is less where the application of the spray was most extended but the reverse is the case with the total yields. In the case of the Burgundy mixture there is an increase of 0.042 tons of healthy tubers per acre in favour of downward spraying, while in the case of Bordeaux mixture the increase is 0.32 tons in the same direction. The differences here are, however, very slight and the results of these plots can scarcely be regarded as providing strong support in favour of downward spraying.

A further experiment, consisting of three plots, was carried out at Cusshatrough. Each plot was sprayed three times with Burgundy mixture (a) downwards, (b) upwards, with a spraying machine, and (c) downwards, with a broom. There were no blighted tubers in the crops raised, and the highest total yield was given by the plot sprayed upwards, viz., 9.6 tons per statute acre. The plots sprayed downwards with machine and broom respectively gave identical yields at the rate of 9.2 tons per statute acre. These results run parallel with those obtained in the plots of the Assistant Agricultural Overseers already dealt with.

From the available evidence therefore it seems not unreasonable to conclude that upward spraying is more profitable than downward spraying. This is of course what would be expected when the probable mode of action of the mixture as a fungicide is considered.

By spraying upwards the plants as a whole become more thoroughly and evenly covered with the mixture, and hence they are better protected against the entrance of the germ-tubes developing from the spores of the blight fungus.

As is well known Bordeaux mixture is prepared from copper sulphate and lime and Burgundy mixture from copper sulphate and soda. Numerous experiments have been carried out by the Department in which the relative merits of these two mixtures have been compared with the result

Bordeaux or Burgundy Mixture? that if anything Burgundy mixture has proved to be on the whole slightly more efficient than Bordeaux (see Leaflet No. 14.) The results of thirty-six comparable plots at Athenry in 1913 show a yield of 10·6 tons per statute acre with 9·9 per cent. of blighted tubers for Burgundy as against 10·7 tons and 9 per cent. in the case of Bordeaux, being something less than a fifth of a ton of healthy tubers per acre in favour of Bordeaux mixture. At Cushatrough the results obtained from sixteen comparable plots were that Burgundy-sprayed plots produced a crop at the rate of 11·94 tons per statute acre, while Bordeaux gave 11·86 tons, there being no blighted tubers in either case. The great advantage of soda over lime is that the mixture made with it is much less likely, if properly prepared, to contain particles of grit which choke the spraying nozzles. Care must be taken in making Burgundy mixture to avoid adding excess of soda for, if this be done, some of the insoluble precipitate first formed becomes dissolved and the resulting dissolved copper compound scorches the foliage when applied to the plants. Further, soda can be obtained practically everywhere while in many districts it is extremely difficult to obtain really good unslaked lime suitable for making Bordeaux mixture.

It was probably owing, at any rate in part, to this difficulty in getting good lime that the manufacture of powders for making spraying mixtures was undertaken. Some years ago there were two or three firms manufacturing such powders in Ireland, but since the use of soda instead of lime has become widely adopted the demand for them appears to have grown less and their manufacture here has been discontinued by two large firms at least. These powders were designed to be mixed in certain proportions with water and sprayed in the liquid form on the plants. Certain farmers, however, soon hit upon the idea of dusting the prepared powders directly on to the potato foliage when it was damp from rain or dew. The results appear to have been fairly satisfactory, but enquiries showed that this practice had been to a large extent given up in favour of spraying in the ordinary way.

During the past two seasons there has been a movement, particularly in England, and to a smaller extent in some parts of Ireland, in favour of the application of powders in the dry way to potatoes as a substitute for spraying with the ordinary Bordeaux or Burgundy mixtures. The method of dry spraying or dusting with a prepared powder is claimed to give excellent results and to be more easily carried out than the ordinary one, hence it is necessary to look into the matter somewhat closely.

In the first place it should be remembered that any specially prepared powders must of necessity, if they are composed of the proper materials, be dearer than the raw materials (copper sulphate, soda or lime) from which they are made. The expenses of manufacture, as well as those of advertising, etc., have to be borne by the purchaser; and if these are not made up for by special advantages such as much greater ease of application or greater efficiency in controlling the blight, the use of such powders cannot be regarded as a paying proposition.

That the powders themselves may not in all cases be above suspicion as regards their composition is suggested by the fact that in one case an analysis of an English powder showed that it contained 46 per cent. by weight of an insoluble siliceous or sandy material, the fungicidal value of which is absolutely *nil*. This powder was recommended as being particularly suitable for use in a country with a moist climate like Ireland. The composition of four other powders examined by the Department's Analyst may be regarded as satisfactory from the chemical point of view.

The powders in question may be divided into two groups (*a*) those containing the soluble ingredients of Bordeaux or Burgundy mixtures mechanically mixed so that when the powder reaches the damp foliage chemical reactions take place there which ordinarily would take place in the vessel in which a spraying mixture was being prepared; (*b*) those consisting of the precipitates of basic carbonates or basic sulphates of copper which have been prepared at the factory and dried, or other similar compounds. In mixing these with water no immediate or profound chemical reactions occur.

There are certain possible disadvantages to be expected in the use of such powders which may be deduced on *a priori* grounds without having recourse to actual field trials of them. Thus, it is at once clear that it is impossible to cover uniformly and protect the same amount of foliage with a dry solid powder dusted on as it would be when an equivalent amount was distributed through the medium of a large amount of a liquid such as water. This fact appears to be proved from the results of experiments in which equivalent weights of one and the same powder were applied to parallel plots (*a*) in the dry state and (*b*) as a spray after mixing with the requisite quantity of water. The yield with the dry powder dusted

on the damp foliage averaged 9.66 tons per statute acre with 4 per cent. of diseased tubers by weight, while with the spray prepared from the powder and applied in the liquid form it was 10.82 tons with only 3.3 per cent. of blighted tubers.

Again, in the case of one powder of the type (a) which was examined and experimented with it was found that it consisted mainly of particles of copper sulphate and of sodium carbonate. These particles were not of equal sizes or weights, and consequently an examination of the composition of the powder when the dusting process had gone on for some little time showed that the remaining portion of the mixture was considerably richer in copper sulphate than the original powder, in other words during the dusting process the soda had been distributed more rapidly than the copper sulphate, and therefore the mixture could not have reached the foliage in the correct proportions to produce the required precipitate. This in all probability explains why in several instances where this powder was tested complaints were made of a certain amount of scorching of the foliage.

Assuming, however, that the particles of such a powder do reach the damp foliage in the proper relative proportions, what happens? In the drop or film of water on the leaf the particles dissolve and a precipitate is formed. Since these particles are close together, the precipitate is produced under conditions of comparatively high concentration on the part of the reacting solutions. Now it is well known that the most efficient precipitates, particularly as regards their power of adherence, are produced in dilute solutions such as are commonly used in preparing the ordinary spraying mixtures. Hence it is to be expected that the precipitates formed on the foliage from this type of dry powder would be more easily washed off by rain than those applied in the ordinary way.

It is well known in making spraying mixtures that if the two solid ingredients are dissolved in the water simultaneously there is a tendency for some of the soluble particles not yet dissolved to become coated with a film of the newly produced insoluble precipitate and therefore to resist solution. The powder of the type (a) referred to is recommended by its makers for use either dry or after dissolving in water, and the phenomenon above alluded to is strikingly exhibited by it when dissolved in water according to the directions supplied. The accompanying Fig. 1 shows the amount of undissolved material left behind on the sieve of a knapsack spraying machine having sixteen meshes to the inch from the preparation of five gallons of the liquid, exactly according to the directions given. The manufacturers of the powder recommend a sieve not finer than thirty to the inch, had one of this fineness been used the material excluded would have been considerably greater in amount. Doubtless waste of material in this way may also occur when the powder is dusted on to damp foliage.

With regard to powders of the type (b) it is well known that the precipitates formed during preparation of normal Bordeaux or Burgundy mixtures are of a gelatinous or colloidal nature and it is owing to this fact that they adhere so well to the foliage. When such precipitates are collected and dried to form a powder their physical properties become changed and the power of adherence is diminished. It would therefore seem probable that such powders when applied to potato foliage either by dusting or by spraying in a watery suspension would be more easily washed off by rain than the ordinary mixtures.

The physical condition of the precipitate in a spraying mixture can at least to some extent be judged of by the length of time which it remains suspended in water or from its rate of sedimentation. In this connection the illustration given in Fig. 2 is instructive.

The mixtures were made up and poured into the cylinders at the same time and the photograph was taken half an hour later. The first three jars on the left contain soda mixtures, the middle lot of four with the possible exception of No. 7 lime mixtures, while the last jar on the right contains copper oxychloride, a material which has been advocated as suitable for making a spraying mixture.

During the half-hour period practically no sedimentation has occurred in cylinder 1 which contains Burgundy mixture, and very little in cylinder 4 which contains Bordeaux mixture. There has been considerable settlement in cylinder 2 which contains a mixture prepared by dissolving in water a powder composed of mechanical mixture of copper sulphate and sodium carbonate. Almost total sedimentation has occurred in cylinder 3 which contains a powder presumably prepared by precipitating copper sulphate with soda with the addition of 46 per cent. of insoluble siliceous material.

Cylinders 5 and 6 contain powders precipitated from copper sulphate by lime, and the settlement here although not quite so complete as in cylinder 3 has been very rapid. Cylinder 7 contains a powder described as "copper oxide hydrate" which has also settled very rapidly.

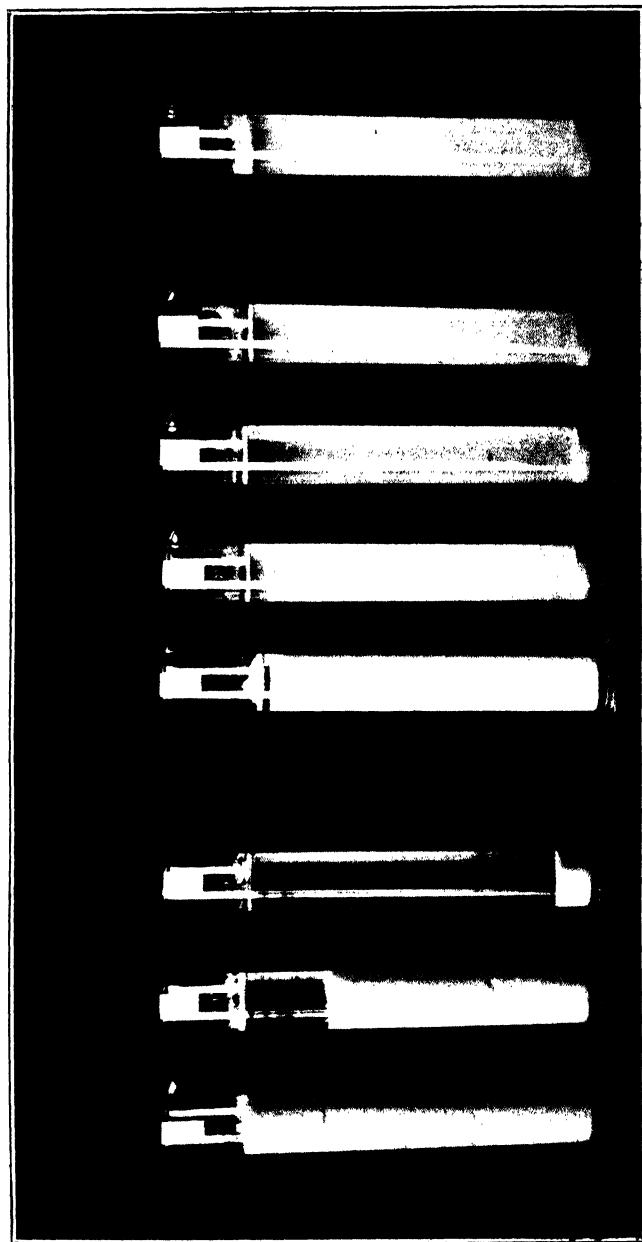
The powders in cylinders 3, 5, 6, 7, and 8 settle so rapidly that very thorough agitation would be needed in the spraying machine to keep them in suspension and thus ensure their even distribution over the foliage. The particles being comparatively coarse and non-gelatinous would be much more easily washed off the leaves on the advent of rain than would the colloidal precipitates in cylinders 1 and 4. Hence it is scarcely to be expected that these powders would be as efficient as ordinary Burgundy or Bordeaux mixtures. The powder in cylinder 2 forms a precipitate which does not settle so rapidly as some of the others and which would, being more or

INVESTIGATIONS ON POTATO DISEASES.



Fig. 1.—The sieve of knapsack spraying machine, 16 meshes to the inch, showing the considerable waste of material which occurs when preparing a spraying mixture from a powder containing both ingredients of Burgundy mixture by dissolving it in water. *See page 441.*

INVESTIGATIONS ON POTATO DISEASES.



1 2 3 4 5 6 7 8
Fig. 2.—Glass cylinders containing spraying mixtures in suspension, illustrating the various rates of sedimentation. See explanation in text, p. 442.

less colloidal, possibly adhere fairly well, but it possesses the disadvantages already mentioned that its particles are not uniform in size, and when "dusted" the soda and the copper sulphate do not reach the foliage in the correct proportions.

It is interesting now to turn from these considerations of a more or less theoretical nature to the results of comparative tests carried out in the field as to the relative efficiency of the two methods of spraying, i.e., the application of the dry powder direct to the damp foliage and spraying with Burgundy or Bordeaux mixtures in the usual way.

So long ago as 1908, tests were carried out by the Department at twelve centres in Ireland on this matter. The powder used was one stated by the manufacturers to be prepared by precipitating copper sulphate solution with lime, and the quantity of it applied per acre was equivalent to the quantity of Bordeaux mixture used for a similar area. In ten cases out of the twelve the results were unfavourable to the powder method. Further trials were made in 1909 with the same powder at thirteen centres. In seven cases a larger yield of healthy potatoes was obtained from the plots sprayed in the ordinary way, in five a better yield was given by the plots in which the powder was dusted on, while in the remaining case the yields of the two plots were exactly equal. The average yield of healthy tubers on the whole thirteen plots sprayed in the ordinary way was at the rate of 11.74 tons per statute acre, while that of the plots dusted with the powder was 11.42 tons. The difference in the average percentage weights of tubers affected with the blight was quite striking, for, with the ordinary mixture this figure was 3.76 per cent., whereas with the powder it reached 9.26 per cent. These results were by no means favourable to the idea that the dusting on of a dry powder was as efficacious a method of combating the blight as the method of spraying ordinarily practised, and the matter was not pursued further at that time.

Owing, however, to the renewed interest displayed during the last two years in regard to the use of powders for potato spraying it was decided to make further trials.

During 1913 therefore four separate series of tests were carried out with one of the newer powders which consists mainly of a mechanical mixture of fine particles of copper sulphate and sodium carbonate, but which was also found on chemical analysis to contain over 9 per cent. of alumina, reckoned as aluminium sulphate. It was tested against ordinary 2 per cent. Burgundy mixture, and the results are summarised in the following table, the total yields being expressed in tons per statute acre.

Series.	Number of Plots.	Dusted with Powder.		Sprayed with Burgundy Mixture	
		Total Yield	Percentage Blighted	Total Yield	Percentage Blighted
1	88	9.66	4.00	10.73	2.33
2	4	10.5	19.3	11.45	8.06
3	2	11.7	(4 tubers)	12.7	Nil
4	6	12.11	1.33	13.11	0.12

The experiments in Series 1 were carried out by the Department's Assistant Agricultural Overseers in the west of Ireland, and each plot had an area of 1-20th statute acre. The plots in Series 2 and 3 were situated at Athenry and Cushatrough respectively, and although smaller in size and fewer in number were most carefully controlled. Those in Series 4 were on three farms in Co. Down, had an area of 1-10th statute acre each, and were under the personal supervision of the County Agricultural Instructor, Mr. W. D. Davidson, B.Sc.

It will be seen that in every case where the powder was used the average total yield was decreased by about one ton per acre while the proportion of blighted tubers was considerably increased, and that therefore spraying in the ordinary way proved to be more efficient than the application of this dry powder.

At Athenry and at Cushatrough experiments were carried out with a second powder prepared from lime and copper sulphate which was tested against Bordeaux mixture. The result was that at the former centre the diminished yield of healthy tubers resulting from the use of the dry powder rather than the ordinary spray was at the rate of 2.69 tons per statute acre, while at Cushatrough where the blight was much less severe this loss was only 0.12 tons per acre.

Experiments were also carried out at Athenry, at Clonakilty, and at one centre in Donegal, with a third powder called "copper oxide hydrate" and said to be a by-product in the extraction of copper from its ores. At Clonakilty the attack of blight was very slight and no differences were noted in the parallel plots. At Athenry there was a loss at the rate of 1.85 tons of sound potatoes per statute acre through the use of the powder, while in Donegal where no blighted tubers were found the reduction in total yield per statute acre was at the rate of 0.68 tons.

From all these experiments it must be concluded that the use of these dry powders for dusting on to the potato foliage does not result in producing as large a crop of healthy tubers as is obtained when spraying is done in the ordinary way. It is probable that if tested in a season in which the attack of blight

was really severe the powders would show to even greater disadvantage.

There are other objections also to the use of these powders. In order to distribute them over large areas horse-machines are required which are considerably more expensive than the ordinary horse-machines. The knapsack machines for distributing them are in several ways unsatisfactory. They are heavier both when full and empty than ordinary machines, they are constructed of tinned iron and not of copper and would consequently soon rust, the leather bellows on them appear to have a very short life (two employed at Athenry became split after being used a very few times) and when a considerable amount of the contained powder has been used it is difficult to distribute the remainder without a constant shuffling of the machine on the back of the operator in order to keep a layer of powder over the opening to the distributing tube.

A further disadvantage in the use of powders arises from the fact that they may only be applied at certain times, namely when the foliage is wet with rain or dew and when there is but little wind. A powder seems to be deflected from its appointed course by currents of air more easily than is the case with a liquid spray, and it certainly is extremely disagreeable, to say the least, when it is blown over the operator. Of course the "handiness" of prepared powders and the saving of the trouble of making up the mixtures with water, together with the less cartage involved in their use are all in their favour, but it is questionable whether these advantages are not more than outweighed by the use of dearer materials, of diminished fungicidal efficiency. The results obtained so far, at any rate, do not at all warrant the revolutionising of the methods of spraying potatoes at present in vogue in this country.

Apart altogether from the fungicidal action of spraying mixtures, the idea is entertained in some quarters that

Physiological spraying has a direct influence on the plant.

Action of Spraying On the one hand this influence is regarded as

Mixtures. beneficial and is looked upon as something

in the nature of a tonic or stimulant while by others it is considered to be of a baneful nature resulting in a diminution of the plant's vigour. Those who favour the first-named idea explain the beneficial action of the spray in various ways. Thus it has been supposed that a certain amount of iron, frequently present as an impurity in copper sulphate, is absorbed by the foliage which thus becomes greener and more efficient in manufacturing plant-food. Again, it has been asserted that particularly in hot bright summers the coating of spray on the foliage acts as a protective screen and prevents the destruction by the sun's rays of some of the green colouring matter of the leaf. It is not possible to go fully into details on the matter here and for further particulars the

literature concerned with this question* should be consulted. Of course the deleterious action of the spray if it exists can be explained by assuming the absorption of small quantities of poisonous soluble copper salts by the living cells of the leaves, or by the blocking of the leaf pores by the spray or in some other such way.

The fact appears to be that we do not yet know with a sufficient degree of certainty whether, in the total absence of blight, potato plants are affected injuriously or beneficially by spraying, although many practical men believe the latter to be the case. In a country like Ireland where the blight is prevalent to some extent every season it is not easy to obtain data from field plots on this question, but starting from the idea that results might be obtained even in the presence of blight by using resistant varieties an endeavour was made in 1913 to obtain some information.

The resistant varieties employed were "Shamrock," and "Champion the Second," and parallel plots of these, sprayed and unsprayed, were laid down at Clifden, at Athenry and at the Albert Albert Agricultural College, Glasnevin. Neither of these varieties is absolutely immune to blight, and both at Clifden and particularly at Athenry, the unsprayed plots did become to some extent blighted, consequently no information of the kind wanted could be obtained from them.

At the Albert College, however, the plots remained free from blight, and the following table of results shows what influence spraying twice with Burgundy mixture had upon the plants, apart from this disease. Each plot had an area of 39 square yards and was originally planted with the same number of tubers. The "seed" for the plots was purchased, and when the plants were at about the flowering stage it was found that there were a considerable number of "rogues" amongst them which had to be removed. This, possibly,

CHAMPION II.						SHAMROCK.					
Sprayed.			Unsprayed.			Sprayed.			Unsprayed.		
Plot No.	No. of Plants	Yield	Plot No.	No. of Plants	Yield	Plot No.	No. of Plants	Yield.	Plot No.	No. of Plants	Yield.
1	132	271	3	136	262	1	116	217	3	134	246
2	131	251	4	133	263	2	124	269	4	126	269
5	135	249	7	130	236	5	121	255	7	128	240
6	136	244	8	129	252	6	130	245	8	130	250
Av.	132.5	253.75	Av.	132	253.25	Av.	122.75	246.5	Av.	129.5	251.25

* See more particularly O. Kirchner Über die Beeinflussung der Assimilations-tätigkeit von Kartoffelpflanzen durch Bespritzung mit Kupfervitriolkalkbrühe. Zeitschr. f. Pflanzenkrankheiten, xviii., 1908, p. 65.

had a slight effect on the yield, especially in the "Shamrock" plots. The yields are expressed in pounds per plot. From the average results of these plots it cannot be said that spraying had any decided influence either in increasing or diminishing the yield. The slightly-increased yield in the unsprayed "Shamrocks" may, perhaps, have been due to the smaller number of rogues removed from these plots than from the sprayed ones.

Brief reference has been made in the two last reports to the question of the production of resting spores by the potato blight fungus. **Laboratory Investigations.** Laboratory work with pure cultures of this fungus on an artificial medium has shown that under such conditions resting spores are indeed produced. Such cultures have been carried on uninterruptedly for three years, and the spores continue to be produced. Up to the present, however, no success has attended the efforts made to induce them to germinate.

A prolonged search has been made for these bodies in the blighted parts of potato plants but without definitely positive results in any case, and certainly with negative results in most cases. The spores have been searched for in affected leaves, stalks, tubers and fruits, but without success. Such affected portions of the plant have been kept under varying conditions in the hope of inducing the production of resting spores, but also in vain. Hence it would appear that although the fungus is capable of producing its resting spores when grown artificially in pure culture, it does not do so under natural conditions on any part of the potato plant, and, therefore, resting spores can be of no practical significance in securing the recurrence of the blight season after season.

II.—THE STALK OR SCLEROTIUM DISEASE.

(*Sclerotinia sclerotiorum* Massee.)

Next to the blight, this disease is probably the most serious one in the West of Ireland. In one respect it may, indeed, be regarded as of more consequence than the blight for the latter can be controlled satisfactorily by spraying, whereas no practical means of doing this have as yet been discovered for the stalk disease or "haughing."

Although it has been proved by investigations carried out at Clifden that the disease is contracted directly from air-borne fungus spores, yet indirectly it is in the soil where the trouble lies. In it are to be found the little black, seed-like *sclerotia*, or resting bodies

of the fungus which, in the spring, germinate and produce on the surface of the ground the so-called "spore-cups," from which myriads of spores are ejected into the air in little puffs. These spores settle on the potato stalks and leaves, and at certain places germinate and cause infection. Later on the stalks become seriously diseased, they fall over prematurely, or become "haughed," consequently the growth of the plants and the formation of tubers reaches a standstill, and a serious diminution in yield is the result. The tubers themselves, fortunately, do not become attacked, and cannot transmit the disease when used for seed purposes.

All experiments in spraying the plants with various fungicides having resulted in failure to control this disease attention has been devoted during the last two seasons chiefly to investigating the relation between the virulence of attack and the date of planting. One point has been clearly established, namely, that the later the potatoes are planted the less is the number of plants which become attacked. Very late planting, of course, results in a reduction in the yield of the crop owing to influences of season, but in 1912 it was found that the best results on the Clifden plots were obtained by delaying planting until the middle of May. It is here that the value of "boxing" comes in. (See Department's Leaflet No. 58.)

In 1913 the experiment of planting at intervals was repeated on a more extensive scale at Clifden, and, in addition,

Early and Late a number of experimental plots were laid down
Planting. by certain of the Department's Assistant Agricultural Overseers in whose districts this disease is prevalent in the West.

At Clifden there were sixty-three plots, each of one square perch in area, devoted to this disease, grouped into three series of twenty-one each. The first series was on land which had already borne a potato crop for two successive seasons previously, the second on land which had borne potatoes the previous year, while the third was on fresh land which had not been tilled but had been in grass for many years and which, therefore, did not harbour the sclerotia of the fungus. At intervals of a fortnight, beginning in the middle of March and ending in the middle of June, three plots were planted with potatoes in each series, "Champions" being used for two plots, and "Irish Queens" for the third, the seed tubers having been boxed the previous autumn and sprouted and one hundred and twenty being used for each plot. As regards cultivation, manuring and spraying, all plots received similar treatment. During the season from towards the end of June until the third week in September the plots were gone over at intervals, and the number of plants affected with the stalk disease in each plot was recorded.

The following table shows the total average yields of the various plots expressed in tons per statute acre.

Time of Planting.	Series I.	Series II.	Series III.	Averages.
Mid. March . .	6.88	8.71	11.52	9.03
End of March . .	8.91	7.75	11.75	9.47
Mid. April . .	9.56	7.59	12.24	9.79
End of April . .	9.33	7.54	11.95	9.60
Mid. May . .	9.11	7.74	10.29	9.04
End of May . .	8.16	8.40	9.25	8.60
Mid. June . .	9.24	8.86	8.46	8.85
Averages . .	8.74	8.08	10.78	

It will be seen that, taking all the series together, the maximum yield was obtained from the plots planted in the middle of April. As was to be expected the yields from the plots in Series III. on fresh land were considerably higher than from these on the old land in Series I. and II. The lowness and irregularity of the yields of the plots in Series II. is partly due to the fact that the land on which they were situated was of poorer and more uneven quality than that in Series I. and III.

The following table shows the average number of affected plants in the various series of plots found at the various countings. Each plot contained one hundred and twenty plants.

Date of Count.	28/6	14/7	29/7	8/8	22/8	4/9	24/9	Series I.	Series II.	Series III.
Mid. March . .	1	25	59	72	101	107	—	106	113	103
End of March . .	2	30	63	65	101	107	—	116	112	94
Mid. April . .	4	17	52	67	94	101	—	113	115	75
End of April . .	9	8	48	70	96	105	—	116	117	82
Mid. May . .	0	0	1	38	77	98	111	119	114	99
End of May . .	0	0	1	25	51	73	93	113	86	79
Mid. June . .	—	0	3	11	23	45	61	95	62	28

The first seven columns of figures give the average number of attacked plants in the corresponding plots of all three series taken together at the various dates of counting, while in the last three columns are given the average number of affected plants found at the final counting in the plots of each series. Not only does the number of attacked plants diminish with lateness of planting, but

it is clearly seen that the number of such plants on the new land in Series III. is considerably less than on the old land in Series II. and I.

It is, of course, not possible to estimate the real amount of loss due to the disease, for this could only be done by comparing the yields of the plots with those of similar plots planted under the same conditions but not attacked by it. Unfortunately, however, at Clifden it is quite impossible to arrange for plots which shall be free from the attacks of the disease, seeing that it is so generally prevalent.

In addition to the plots at Clifden experiments were carried out by Assistant Agricultural Overseers at fourteen centres. Each of these consisted of four plots of one square perch each in area which were planted with 120 tubers each in the middle of the months of March, April, May and June, respectively. The attacks of stalk disease at the various centres differed somewhat in intensity. At seven of them the number of attacked plants in the plots most seriously affected, i.e., these planted in the middle of March, varied at the final count from sixty-eight to one hundred and nineteen, in the remainder from ten to thirty-four.

The following table summarises the average results obtained from

Time of Planting.	Total Yield Tons per St. Acre.	Average No. of Plants affected at last count.
Mid. March	10.1	56
Mid. April	10.4	51
Mid. May	9.6	37
Mid. June	7.3	13

all the centres, and even if those from the seven centres where the attack was slight are omitted the relative values of the figures are practically the same. Here, again, is clearly seen the considerable falling off in the number of affected plants in the later planted plots; and the maximum yield was obtained, as was the case at Clifden, in those plots planted in the middle of April. In the West of Ireland it is customary to plant potatoes much earlier than this, and these results combined with those of 1912, when the maximum yield was obtained from plots planted in the middle of May, tend to show that, provided the seed potatoes are boxed during the previous autumn and sprouted, they may be planted, in districts where the stalk disease prevails, with advantage considerably later than is the usual practice.

III.—BLACK STALK ROT.

(*Bacillus melanogenes* P. & M.)

This bacterial disease, as was explained in last year's report, has practically been eliminated from the Clifden plots, and no experiments were carried out with it in 1913. It is, however, perhaps worthy of being put on record that the season, owing to the wet and cold spring, was very favourable to the development of the disease, complaints of it having been fairly general.

As showing the influence of planting at different dates on the development of this disease, the following figures, supplied by one of the Department's Assistant Agricultural Overseers, are interesting. The plots were planted from the same stock of seed potatoes (one hundred and twenty being used for each plot) in the middle of the months of March, April, May and June. In the March planted plots there were 45 diseased plants, in the April ones 24, and in the May and June ones 8 and 4 respectively. The probable explanation is that whereas the tubers planted in March and April developed sprouts which, owing to unfavourable conditions, grew but slowly and were of reduced vitality, those planted in the finer weather of May and June developed more rapidly and produced more robust sprouts which soon became independent of the parent tubers and were sufficiently hardy to resist infection from them or possibly from the soil.

IV.—“CORKY” OR “POWDERY” SCAB.

(*Spongospora subterranea* Johnson.)

Some of the varieties which have been undergoing trials during the previous three years as to their relative powers of resistance to attack by this form of scab were again tested. The plots were on land which had been cropped with potatoes for four years in succession and which was known to be strongly contaminated with the organism which causes the disease. The percentage weight of seriously affected tubers found in the different varieties was as follows :—

British Queen, . . .	34·6 per cent.
Irish Queen, . . .	34·5 „
Flourball, . . .	32·0 „
Up to Date, . . .	24·6 „
Brian Boru . . .	23·4 „
Red Cup, . . .	21·8 „

If the figures in this list be compared with those in the table given in last year's report it will be found that the variety British Queen has changed its position from the bottom to the top of the list, and a very similar change has occurred with the variety Flourball.

It may now safely be stated that among the varieties tested there is not one which shows any distinct or constant tendency to resist the scab.

A single experiment was carried out on a method of soil treatment which it was thought might reduce the attack of the scab. Two plots of land which were known to be strongly contaminated with the scab-producing organism were treated with a mixture of sulphate of ammonia and lime at the rate of thirty pounds of the former to fifteen of the latter per square perch. The mixture was applied to the land immediately after preparation and was worked into the soil, the idea being that the free ammonia gas liberated would kill the germs of the scab-producing organism resting in it. A period of a fortnight was allowed to elapse before the sprouted tubers were planted and artificial manures only were applied to the plots at the rate of 10 cwt. per statute acre.

As was to be expected from the additional dose of "nitrogen" applied the growth of stalks was very luxuriant and the foliage was of a remarkably deep green colour. The land was poor, reclaimed bog, and seeing that it had already been cropped with potatoes during the four previous seasons, a heavy crop was scarcely to be expected. The total yield was only at the rate of 6.6 tons per statute acre, but the percentage weight of tubers affected with Powdery Scab was only 14.3, a figure which is just half of that obtained, on the average, from neighbouring untreated plots on similar land. It would therefore appear that this method of soil treatment is capable of producing a very considerable reduction in the yield of affected tubers, but not a sufficiently great one to warrant its being adopted on a practical scale.

V.—PINK ROT AND WILT.

(*Phytophthora erythroseptica* Pethyb.)

During the period with which this report deals some important information has been added to what was already known of this disease. The details have already been published in a scientific paper* and may be briefly summarised here.

As regards the fungus which causes the disease it may be recalled that it was found to produce its sexually formed resting spores by a method which was quite novel but which was proved to occur also in the blight fungus (*P. infestans*) and in *P. Phaseoli*. It has now

*Pethybridge G. H. Further observations on *Phytophthora erythroseptica* Pethyb., and on the disease produced by it in the potato plant. *Scient. Proc. Royal Dublin Society*, vol. xiv. (N.S.) No. 10, Jan., 1914.

been shown by the researches of Dr. Butler and Mr. Dastur in India that two other species of *Phytophthora*, viz., *P. Colocasiae* and *P. parasitica* form their resting spores in a similar manner.

Up to the time of publication of the last report both the non-sexual and the sexually formed spores of *P. erythroseptica* had been found only when the fungus was grown artificially in pure cultures, but during 1913 as a result of careful search these bodies were found in plenty on plants in the field. The parasite was found not to be confined to the tubers but was proved to be present in many cases in any or all of the parts of the potato plant which live underground. Thus it was found in the basal portions of the stalks, in the roots, in the rhizomes or underground stems which bear the tubers as well as in the tubers themselves. It was also found that in these parts of the plant including in one case a tuber the spores were abundantly produced. In the case of the tuber the resting spores were found to be present in great abundance just beneath the skin after it had been allowed to remain and become thoroughly rotted in the soil.

During the two previous seasons spores had never been found in or on the tubers although very careful search had been made for them, but the tubers examined were such as had not been allowed to lie in the soil until they were completely rotten. When they were found in the tuber mentioned above, experiments were made to try and obtain further examples of tubers with the resting spores in or on them. For this purpose healthy tubers were inoculated with a pure culture of the fungus, and when the rot had commenced some of them were buried in soil in pots so as to complete the rotting process underground while others were kept in moist air in covered glass dishes. After a period of about three and a half months a careful microscopic examination of the rotted tubers was made with the result that in the tubers kept in moist air only not a single spore could be found, whereas they were found to be present on the tubers which had been buried in soil. In such tubers they were found as before, just beneath the skin and also on the outside of it. They were, however, only found outside the skin in places where it had apparently become broken by some means possibly at a scab spot or at a point where a pustule of some other fungus such as a *Fusarium* had been formed. The tubers were in such an advanced stage of decay when examined that certainty on this point could not be arrived at, but it is believed that the pink rot fungus itself does not possess the power of penetrating the intact skin of the tuber either from within outwards or in the reverse direction. Whatever may be the actual state of affairs in regard to this point, however, the important fact is that attacked tubers if left to remain in the soil are the seat of the production of the resting spores of the fungus and thus the soil may become charged with the disease from them.

The same thing holds good with regard to the rotting stalks, rhizomes, and roots, the resting spores of the fungus formed in them reach the soil when the decay of such portions of the plant is complete. It is easy therefore to see that the source from which the plants become infected is the soil, and microscopic examination of the soil in which such affected parts of the plant had been allowed to decay actually showed the presence in it of these spores. The germination of the resting spores has also been followed in detail and a description of the process will be found in the paper referred to above.

A further important point which has been established with practical certainty is that the fungus which causes pink rot of the tuber really causes a disease of the potato plant as a whole. This disease is of the "wilt" type and the symptoms of it (which begin to be appreciable as a rule somewhat late in the season) are in general somewhat similar to those of the Black Stalk Rot disease. The foliage of affected plants, from about the middle of August onwards, becomes pale green or even yellow in colour, while the margins of many of the leaflets especially of the younger leaves become rolled upwards and inwards being brown, dry and crisp. Areas of dry, brown, dead tissue occur scattered over many of the leaflets and their margins are affected in the same way.

Very frequently close to the surface of the soil there is a more or less conspicuous crop of small aerial tubers. If such affected stalks be pulled up their underground portions will be found to be more or less rotten, and the same is the case with some of the roots, rhizomes and tubers. If these decayed underground portions be examined with the microscope the fungus will be found in all of them and, except in the case of the tubers at this stage, both of its kinds of spores may be found.

A photograph of an affected plant is reproduced in Fig. 3. The three detached blackish tubers in front on the left were quite rotten, the two on the small box behind these were already partially decayed and still attached to the rhizome. The two large tubers on the right were themselves at the time of digging healthy but the rhizome which bore them was attacked. These two tubers still attached to the affected rhizome were carefully buried in soil, and on lifting them again after a couple of weeks it was found that the disease had entered them from the rhizome and they were then seriously decayed.

From what has been said it will be clear that we have to do here with a disease of the potato plant as a whole, the most serious consequence of which results in the rotting of the tubers. That the disease is directly contracted from the soil has been proved both by pot cultures and by experimental plots at Clifden. It, however,

INVESTIGATIONS ON POTATO DISEASES.



Fig. 3. —A potato plant affected with the Pink Rot
“ Wilt ” disease. *See text, p. 454.*

only assumes a serious aspect on land which has borne a crop of potatoes for several seasons in succession. On land of this character at Clifden the loss has been as high as twelve per cent., but on adjoining fresh land the loss has been practically negligible.

There is at present no satisfactory evidence to show that the disease can be transmitted by the "seed" potatoes. It is, of course, conceivable that healthy tubers raised from contaminated land might carry on their surfaces in the mechanically adhering soil some of the resting spores of the fungus. That the risk from this source is, however, extremely slight, is shown by the fact that when such tubers were used for seed at Clifden on fresh land the yield of affected tubers in the resulting crop was only 0.03 per cent. of the whole. Even this may not have been due to the tubers used but may possibly have resulted from slight contamination of the fresh land from the adjoining affected land by transference of small amounts of the soil of the latter on the boots of the labourers or on the implements used, for no special precautions were taken to prevent it.

To avoid this disease, therefore, potatoes should be grown only on land in proper rotation, and all affected parts of the plants, including the diseased tubers, should be removed from the land and destroyed, as otherwise they are a source from which it becomes contaminated.

In addition to the work done on the above-mentioned diseases the study of the *Verticillium* form of "Leaf Roll" has been continued, and the results have been confirmatory of those obtained in previous years. The investigations made show that a specific *Verticillium* disease of the potato plant exists, one of the symptoms of which is a rolling of the leaflets. It is, however, doubtful whether the name "Leaf Roll," is a suitable one for the disease, seeing that this symptom often accompanies other diseases. It is hoped to bring the investigations on this disease to a close at the end of the coming season, when a detailed account of the observations made will be published. The trouble does not appear to be of any serious consequence in Ireland at present, for the case under investigation is the only one which so far has been brought to light in the country.

During the course of the work reported upon above I have had the advantage of the assistance of Mr. H. A. Lafferty in the laboratory, and of Mr. J. J. O'Connor in the field at Clifden, as well as that of Mr. T. O'Connell at Athenry, and to the labours of these gentlemen the successful carrying-out of the experiments is mainly due.

GEO. H. PETHYBRIDGE.

LIVE STOCK FEEDING EXPERIMENTS.

Until 1912 the Department's live stock experiments were confined mainly to their Agricultural Stations. This practice was adopted because there are greater facilities for such work at these Stations than on most farms. Furthermore, until recently, the Agricultural Instructors have been fully occupied in advisory work and in carrying out field experiments. Much progress, however, has now been made in the latter work, and a large staff of experienced Instructors are thus in a position to devote a part of their attention to live stock experiments. Accordingly, in the year 1912, the Department devised a series of Live Stock Feeding experiments to be undertaken by County Agricultural Instructors.

The results obtained during the first season, 1912, were published in Vol. XIII., No. 3, of the Department's JOURNAL. Experiments were continued on the same lines in 1913, and the results were remarkably uniform with those of the previous year. In view of the uniformity of the results from considerable numbers of animals, the experiments in question have been discontinued as it was considered that they had supplied sufficiently reliable data regarding the questions at issue. A new set of tests of a somewhat similar nature is now being undertaken.

Before summarising the complete results of the experiments recently concluded, it may be well to review briefly the nature and objects of each series.

I.—Pig feeding experiments.

The objects of the two sets of pig feeding experiments were to obtain definite information regarding two points

Nature and Objects of the Experiments.	concerning which much difference of opinion exists, viz. :— (1) Can pigs be fattened successfully without potatoes? (2) What are the relative values of barley, meal and maize meal for fattening pigs?
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II.—Calf feeding experiments.

The Department's calf feeding experiments with milk substitutes during the years 1901 to 1903, inclusive (see JOURNAL, Vol. III., No. 4; Vol. IV., No. 3; Vol. V., No. 8), showed that excellent results were obtained from the calves fed on separated milk and a calf meal composed of

- 1 part ground flaxseed,
- 2 parts oat meal,
- 2 parts maize meal.

This mixture has since been regarded as a standard calf meal and generally recommended as such by the Department, see Leaflet No. 54—Calf Meal.

Whilst this calf meal gave very satisfactory results, it cannot of course be claimed that this particular mixture of meals is necessarily the best that can be devised. A most useful purpose would be served by the discovery of a meal mixture which would give better results at the same cost, or as good results at a lower cost than the mixture already mentioned.

Since wheat meal is generally distinctly cheaper and sometimes more easily procured than oatmeal, it was decided to determine by experiment whether some economy might not be effected by substituting the former for the latter in the standard mixture. The calf feeding experiments under review, therefore, were designed to test the relative values of oat meal and wheat meal as ingredients of a calf meal.

III.—Cattle feeding experiments.

There are few more important problems for farmers who fatten cattle, than the question as to when it is economical to sell home-grown grain and replace it by purchased feeding stuffs. At the request of the County Dublin Farmers' Association, the Department, in 1911, conducted two experiments in Counties Dublin and Louth, to compare the relative merits of home-grown and purchased feeding stuffs when fed to cattle on grass.

A full description of these experiments was published in the Department's JOURNAL, Vol. XII., No. 1. The results were slightly in favour of the imported foods, but as it was obviously impossible to draw definite conclusions from such a limited number of tests carried out during one season only, it was decided to repeat the experiments on a more extensive scale and also to carry out tests on the same lines with stall-fed cattle. Accordingly the work was continued in 1912 and 1913; the results for those two seasons are summarised in this report.

In arranging the different experiments outlined above, special endeavours were made to ensure that:—

- (1) The subjects of investigation should be of the widest interest and economic importance.
- (2) The plan of the experiments should be as simple as possible so that the tests could be carried out under ordinary farm conditions.
- (3) The experiments should be carried out on a scale that would obviate risk of appreciable error and so enable reliable deductions to be drawn from the results.

As a rule, a farmer is not very much concerned in noting how the greatest increase is secured, a far more important question for him is to ascertain the means by which a unit of weight can be produced at the lowest cost. Accordingly; in order that these results may be presented in as simple and plain a manner as possible, many details, which, though interesting in themselves, do not bear directly on the main issue have been excluded from the following reports. For instance, no reference is made to the value of the animals at the beginning or end of the experiments, nor is an estimate made of the financial returns, as this depends largely upon the personal skill exercised in buying and selling, the fluctuations in market prices, etc. For the same reason incidental expenses, such as cost of attendance, fuel, and other items, which were the same for each lot of animals, have been omitted, as they in no way affect the comparisons between the different lots.

The prices put upon the various foods used in the tests have been arrived at by taking the average general price throughout the country for a number of years.

In all live stock experiments, the results, of course, depend very largely on the individuality of the animals, for every rearer and feeder knows that though two animals may receive an equal weight of the same food-stuffs and are otherwise similarly treated, one animal often shows a greater increase in weight than the other, because the former is a better "doer" or "thriver" than the latter. General health, robustness of constitution, age, sex, and the previous treatment of the animals must be taken into account when a rearing or feeding experiment is planned. It is a matter of great difficulty to eliminate the influence of these factors, and, consequently, in live stock experiments the conditions cannot be so completely controlled as in most experiments in natural science. Careful experimenters have recourse to several methods for minimising the variations due to the disturbing influence of the above-named factors. These methods are:—(1) To experiment upon as large a number of animals as possible and to consider the results obtained from the whole batch rather than results obtained from individual animals. By this means the disturbance due to the fact that one animal may give a better return for its food than another is largely obviated. (2) To choose the batches so that the ages of the various animals are as nearly equal as possible, and to divide the sexes equally amongst the various batches.

The Instructors in charge of the experiments were directed to observe these precautions carefully and to weigh the animals at the beginning and close of the experiment under conditions as similar as possible.

I.—PIG FEEDING EXPERIMENTS.

SERIES I.—POTATOES AND MEAL COMPARED.

This experiment was undertaken with a view to gaining further information regarding the comparative values of potatoes and a mixture of meals for the production of pork.

During the two past seasons, the test has been carried out with 148 pigs at 20 centres distributed throughout 13 counties.

At each centre the pigs selected for the experiment were divided into two equal lots, as even as possible as regards age, weight, breeding and quality. Their average age was 13½ weeks.

Both lots were treated exactly alike in every respect, except that Lot I. received a certain quantity of potatoes in addition to other foods (chiefly maize meal, pollard, and separated milk), whilst Lot II. was given an extra allowance of one pound of the meal mixture for every four pounds of potatoes fed to Lot I.

Although the feeding at several centres differed in minor details, the main issue of the test was not prejudiced thereby, and the returns from all the centres are strictly comparable.

The average duration of the experiment was 108 days.

The kinds, quantities and cost of the foods consumed by each lot of pigs are set forth below.

Lot I.—*Potatoes.*

Food	cwt.	lb.	Price per cwt.		£	s.	d.
			s.	d.			
Maize meal ..	141	21	7	6	52	18	11
Pollard ..	89	101	7	0	31	9	4
Oat meal ..	0	84	12	0	0	9	0
Potatoes ..	554	28	2	0	55	8	6
Separated milk, 3,247 gallons at 1d. per gallon					18	10	7
*Linseed cake ..	2	28	10	6	1	3	8
*Table refuse, say ..	—	—	—	—	0	10	0
TOTAL,					£155	10	0

Lot II.—*No Potatoes.*

Maize meal ..	220	92	7	6	82	16	2
Pollard ..	146	26	7	0	51	3	7
Oat meal ..	0	84	12	0	0	9	0
Separated milk, 3,247 gallons at 1d. per gallon					13	10	7
*Linseed cake ..	2	28	10	6	1	3	8
*Table refuse, say ..	—	—	—	—	0	10	0
TOTAL,					£149	13	0

*Linseed cake was fed at one centre only; a similar remark applies to table refuse.

It will be seen from the foregoing statement that the pigs in Lot II., which received no potatoes, consumed 185 cwt. 108 lb. more meal (consisting, roughly, of two-thirds maize meal and one-third pollard) than did those of Lot I., which got an allowance of potatoes (total, 554½ cwt. or practically 8 lb. per head daily), or, as already stated, for every extra pound of meal supplied to the former, the latter consumed approximately 4 lb. of potatoes.

Live weight increase.

Lot.	No. of Pigs.	Average weight at beginning.	Average weight at close.	Average increase in 108 days.	Average daily gain.
Lot I, Potatoes .	74	cwt. lb. 0 73	cwt. lb. 2 11	cwt. lb. 1 50	lb. 1·50
Lot II, No Potatoes.	74	0 72	2 14	1 54	1·54

The above figures show that the average daily gain in live weight was practically the same for each lot of pigs.

The results from individual centres show that in thirteen instances the daily increase was slightly greater from Lot II. In five cases it was in favour of Lot I; and at two centres the daily increase was identical. At ten centres it was possible to get the dead weights only at the end of the experiment; the live weight in these cases is calculated therefrom by allowing 25 per cent. for offal.

Cost of production (food only).

Lot.	Total cost of foods.	Total live weight increase.	Cost of producing 1 cwt. live weight increase.
	£ s. d.	cwt. lb.	£ s. d.
Lot I, Potatoes	155 10 0	107 4	1 9 1
Lot II, No Potatoes.	149 13 0	109 76	1 7 3

The buyers of the pigs at the end of the experiments were asked to give their opinion upon the quality of the pork. In eight instances they reported in favour of the pigs fed on meal alone; in four cases they favoured the pigs which received potatoes. In the case of the pigs from the other eight centres the buyers either failed to report upon the quality, or they were unable to distinguish any difference between the two lots.

Whilst the results of the two systems of feeding were very similar on the whole, nevertheless, in respect of rate of increase in live weight, cost of producing a given increase in live weight and quality of pork, the pigs fed on meal alone were slightly, but fairly uniformly, superior to the pigs which received potatoes.

Conclusions.—Having regard to the large number of pigs included in the experiments and the uniformity of the results from individual centres, where the general system of management, other than the character of the food, varied, it may be claimed that the results of the experiments under review, together with those previously obtained at the Clonakilty Agricultural Station (see Vol. XI., No. 2, of the Department's JOURNAL), show that :—

- (I) Pigs can be fattened successfully without potatoes.
- (II) The question as to whether potatoes should be sold or fed to pigs depends largely upon the current prices of potatoes and meal respectively.
- (III) It is very doubtful whether it is economical to feed pigs on saleable potatoes if they can be sold for one-fourth the value of meal, in addition to the cost of marketing.

The above remarks do not of course apply to small or diseased potatoes which cannot be utilised to better advantage than as food for pigs.

SERIES II.—BARLEY MEAL COMPARED WITH MAIZE MEAL.

The object of this experiment was to compare the relative values of barley meal and maize meal for fattening pigs.

The experiment was conducted with 106 pigs at fifteen centres in nine countries. As in the case of the former experiment, the pigs were divided into two equal lots. At the commencement the average age of the pigs was 13 weeks. The experiment lasted, on an average, 100 days.

At eleven centres the two lots of pigs were fed exactly alike except that one lot was fed on a certain quantity of barley meal, whilst the other lot received an equal quantity of maize meal. At four centres there was a slight difference in the quantities of food consumed by the two lots of pigs. This fact, however, in no way affects the comparative results or the general principle of the experiment.

The kinds, quantities and cost of the foods consumed by each lot of pigs were as follows :—

Lot I.—*Barley meal.*

		Price per cwt.			
Food	cwt. lb.	s. d.	£	s. d.	
Barley meal	184 99	7 0	47	4 2	
Potatoes	839 9	2 0	38	18 2	
Swedes	35 0	8 0 (per ton)	0	14 0	
Separated milk, 1,062 gallons at 1d. per gallon			4	8 6	
*Linseed cake ..	2 0	10 6	1	1 0	
*Table refuse, say ..	—	—	0	10 0	
TOTAL,			£87 15 10		

Lot II.—*Maize meal.*

		Price per cwt.			
Food	cwt. lb.	s. d.	£	s. d.	
Maize meal	135 23	7 6	50	13 11	
Potatoes	335 65	2 0	33	11 2	
Swedes	35 0	8 0 (per ton)	0	14 0	
Separated milk, 1,051 gallons at 1d. per gallon			4	7 7	
*Linseed cake.. ..	2 0	10 6	1	1 0	
*Table refuse, say ..	—	—	0	10 0	
TOTAL,			£90 17 8		

Live weight increase.

Lot.	No. of pigs.	Average weight at beginning.	Average weight at close.	Average increase in 100 days.	Average daily gain.
		cwt. lb.	cwt. lb.	cwt. lb.	b.
Lot I, Barley meal .	53	0 79	2 1	1 34	1.46
Lot II, Maize meal .	53	0 80	2 5	1 37	1.49

The above figures show that, during a fattening period of 100 days, there was, on an average, a difference between the two lots of only 3 lb. per head live weight increase in favour of the maize fed pigs. This amount is so small that for all practical purposes the results may be regarded as equal. It is worthy of note, however, that at twelve of the fifteen centres the results were slightly in favour of the maize fed pigs.

*Linseed cake and table refuse were used at one centre only.

Cost of production (food only).

Lot.	Total cost of food.	Total live weight increase.	Cost of producing 1 cwt. live weight increase.
	£ s. d.	cwt. lb.	£ s. d.
Lot I, Barley mea ¹	87 15 10	68 108	1 5 6
Lot II, Maize meal	90 17 8	70 48	1 5 10

As regards the quality of the pork—the buyers favoured the barley fed pigs in seven instances, and the maize fed in one instance. At the remaining seven centres no distinction was made between the two lots in this respect. In no case, however, was an extra price paid for superior quality in either lot of pigs.

In the two experiments where swedes were fed instead of potatoes the pigs made very slow progress, the average daily increase scarcely exceeding one pound per head.

It is necessary to repeat that the estimated cost of production, which is seen to vary in the two experiments from 25s. 6d. to 29s. 1d. per cwt., is based on the cost of the food only, hence the low figures. In practice, many other items, such as charges for attendance, fuel, risk, interest on capital, the extra price per cwt. often paid for bonhams over the selling price, etc., have to be considered. They are not included in this estimate because they vary so much according to local circumstances; furthermore, these points do not bear directly on the experiment.

Conclusions.—The results of this series of experiments appear to indicate that maize is worth approximately 10s. per ton more than barley meal for pig feeding. As regards the quality of the pork, barley meal seems to be slightly superior to maize meal.

II.—CALF FEEDING EXPERIMENT.

This experiment was designed to compare the value of oat meal and wheat meal, respectively, when used in conjunction with maize meal and ground flaxseed for calf feeding.

During the past two seasons the experiment has been carried out at thirty-one centres in sixteen counties.

The calves selected for the experiment, 244 in number, were divided into two even lots of 122 each; their average age at the commencement was seven weeks. The experiment lasted on an average 117 days.

The meal mixture fed to each lot of calves was as follows:—

Lot I.	Lot II.
1 part ground flaxseed.	1 part ground flaxseed.
2 parts maize meal.	2 parts maize meal.
2 parts oat meal.	2 parts wheat meal.

In all other respects, each lot of calves was treated exactly alike.

The following statements show the quantity and cost of the foods consumed by each lot of calves during the experiment.

Lot I.—*Oatmeal mixture.*

Food	cwt. lb.	Price per cwt.		£	s.	d.
		s.	d.			
Oat meal mixture ..	105 92	14	0	74	1	6
Linseed cake ..	31 72	10	6	16	12	3
Whole milk, 91 gallons at 5d. per gallon				1	17	11
Separated milk, 18,765 gallons at 1d. per gallon				78	3	9
TOTAL,				£170	15	5

Lot II.—*Wheat meal mixture.*

Wheat meal mixture ..	105 83	13	0	68	14	7
Linseed cake ..	31 72	10	6	16	12	3
Whole milk, 91 gallons at 5d. per gallon				1	17	11
Separated milk, 18,765 gallons at 1d. per gallon				78	3	9
TOTAL,				£165	8	6

The total and average gains in live weight made by each lot of calves were as follows:—

Live weight increase.

Lot.	No. of calves.	Average weight at beginning.	Average weight at close.	Average increase in 117 days.	Average daily gain.
		cwt. lb.	cwt. lb.	cwt. lb.	lb.
Lot I, Oat meal mixture .	122	1 33	2 111	1 78	1.52
Lot II, Wheat meal mixture .	122	1 32	2 109	1 77	1.62

It will be seen from the above figures that the live weight increase made by the two lots of calves was practically identical. Of the

results of individual centres, 17 were in favour of wheat meal and 13 in favour of oat meal, whilst in one case the results were equal. On the whole, there was no appreciable difference in the health or appearance of the two lots of calves.

Cost of production (food only).

Lot.	Total cost of foods.	Total live weight increase.	Cost of producing 1 cwt. live weight increase.
	£ s. d.	cwt. lb.	£ s. d.
Lot I. Oat meal mixture . . .	170 15 5	206 90	0 16 6
Lot II. Wheat meal mixture . .	165 8 6	205 102	0 16 1

In the above estimates, no account is taken of the value of the hay consumed in the house, or of the grazing outside. Since each lot of calves, however, was treated exactly alike in these respects the comparison between the two meal mixtures is in no way affected.

Conclusions.—The difference in the cost of production is so small that it would appear that the two meal mixtures are of practically equal value at the prices mentioned.

III.—CATTLE FEEDING EXPERIMENTS.

Home-grown and Imported Feeding Stuffs.

Two series of experiments were commenced in 1912 to determine the relative values of home-grown and imported feeding stuffs when fed to fattening cattle (*a*) on grass, and (*b*) in stalls.

EXPERIMENT A.—WITH CATTLE ON GRASS.

This experiment has been conducted at 14 centres in 9 counties, and data relating to the feeding of 124 cattle (62 in each lot) are now available.

The two lots of cattle were treated exactly alike in every respect, except that Lot I. received a mixture of home-grown concentrated foods, whilst Lot II. was given a corresponding quantity of imported foods.

The mixtures of foods were made up as follows :—

Home-grown.
 1 part wheat meal,
 1½ parts barley meal,
 2 parts ground oats,

Imported.
 1 part maize meal,
 2 parts undecorticated cotton
 cake.

At each centre the cattle were grazed in separate fields as similar in size and quality as could be selected; as a further precaution, however, the two lots were changed from one pasture to the other weekly or fortnightly.

At the beginning of the experiment, three pounds of the above mixtures of concentrated foods were given per head daily, this amount was afterwards increased to four, and finally to five pounds towards the close of the fattening period.

The average duration of the experiment was 79 days.

The most important data relating to the test are summarised in the following tables:—

Quantity and cost of concentrated foods.

Food.	Total quantity consumed.		Price per cwt.	Total cost.	Manurial value.*	Total cost less manurial value.
	cwt.	lb.	s. d.	£ s. d.	£ s. d.	£ s. d.
HOME-GROWN—						
Wheat meal	43	60	8 0	17 8 3	1 13 1	15 15 2
Barley meal	65	34	7 0	22 17 1	2 5 2	20 11 11
Ground oats	87	8	6 8	29 0 6	3 5 4	25 15 2
Totals	195	102	—	69 5 10	7 3 7	62 2 3
IMPORTED—						
Maize meal	65	34	7 6	24 9 9	2 2 11	22 6 10
Undecorticated cotton cake	130	68	6 6	42 9 0	10 19 4	31 9 8
Totals	195	102	—	66 18 9	13 2 3	53 16 6

Live weight increase.

Food.	No. of cattle.	Average weight at beginning.	Average weight at close.	Average increase in 79 days.	Average daily gain.
		cwt. lb.	cwt. lb.	cwt. lb.	lb.
Home-grown	62	7 68	9 57	1 101	2·70
Imported	62	7 72	9 61	1 101	2·70

* These figures are calculated from the data given in the table reproduced in the Department's Leaflet No. 2—The Use and Purchase of Feeding Stuffs, showing the composition and manurial value of the principal foods.

Cost of production (food only).

Food.	Cost of concentrated food (less manurial value)	Cost of grazing.	Total cost of foods.	Total live weight increase.	Cost of producing 1 cwt. live weight increase.
	£ s. d.	£ s. d.	£ s. d.	cwt. lb.	£ s. d.
Home-grown . .	62 2 3	69 19 5	132 1 8	117 102	1 2 5
Imported . .	53 16 6	69 19 5	123 15 11	117 102	1 1 0

The cost of pasturage for each lot of cattle was calculated at 2s. per head per week.

This value is, perhaps, open to criticism, for instance, it may be too high for some districts and too low for others. The quality and rental of pastures, however, vary so much in different districts that it is difficult to fix a figure that would be generally applicable.

It is probable that 2s. per head per week is rather below the average for the whole country, but it must be borne in mind that in fixing this figure no account has been taken of high prices paid for the best grazing land, on which cattle seldom receive cake or meal. Further, as the same amount is charged to each lot of cattle the value put upon the grazing in no way affects the main object of the experiment.

The average results of these experiments show that the increase in live weight made by the two lots of cattle was identical, but that the cost of production was somewhat in favour of the imported foods. The results were slightly in favour of the imported foods at nine of the fourteen centres.

EXPERIMENT B.—WITH STALL-FED CATTLE.

This test has been made at 21 centres distributed throughout 9 counties. Complete returns are available for 176 cattle, i.e., 88 fed on each of the rations.

The foods tested in this case were as follows :—

Home-grown.

- 1 part wheat meal.
- 1½ parts barley meal.
- 2 parts ground oats.

Imported.

- 1 part decorticated cotton cake
- 2 parts maize meal.

The mixture of home-grown foods was identical with that used in the grazing test.

The mixture of imported foods was modified by the substitution of decorticated for undecorticated cotton cake and by a change in the proportion of maize meal.

At fifteen centres, part of the decorticated cotton cake was replaced by linseed cake during the finishing period.

The same quantity of the mixtures of concentrated foods was fed to each lot of cattle; at the commencement three pounds per head daily were given, and this quantity was gradually increased during the experiment until, in some cases, as much as ten pounds were supplied.

The experiment lasted on an average 82 days.

The principal details of this test are shown in the following tables :—

Quantity and cost of concentrated foods.

Food.	Quantity consumed.	Price per cwt.	Total cost.	Manurial value.	Total cost less manurial value.
	cwt. lb.	s. d.	£ s. d.	£ s. d.	£ s. d.
HOME-GROWN—					
Wheat meal .	90 54	8 0	36 3 11	3 8 8	32 15 3
Barley meal .	135 81	7 0	47 10 1	4 13 9	42 16 4
Ground oats .	180 108	6 8	60 6 5	6 15 8	53 10 9
Totals .	407 19	—	144 0 5	14 18 1	129 2 4
IMPORTED—					
Maize meal .	271 50	7 6	101 15 9	8 18 8	92 17 1
Decorticated cotton cake .	114 25	9 6	54 5 1	15 13 2	38 11 11
Linseed cake .	21 56	10 6	11 5 8	2 0 2	9 5 6
Totals .	407 19	—	167 6 6	26 12 0	140 14 6

In addition to the concentrated foods mentioned in the foregoing table, each lot of cattle consumed equal quantities of roots, hay and straw as follows :—

	tons	cwts.	qrs.		£	s.	d.
Roots	256	1	3 at 8s. per ton	. . .	102	8	8
Hay	26	5	2 at 40s. per ton	. . .	52	11	0
Straw	14	8	3 at 30s. per ton	. . .	21	13	1
Total,					£176	12	9

Live weight increase.

Food.	No. of cattle.	Average weight at beginning.	Average weight at close.	Average increase in 82 days.	Average daily gain.
		cwt. lb.	cwt. lb.	cwt. lb.	lb.
Home-grown . .	88	9 72	10 103	1 31	1·74
Imported . .	88	9 63	10 102	1 39	1·84

Cost of production (food only).

Food.	Cost of concentrated food (less manurial value).	Cost of roots, hay and straw.	Total cost of foods.	Total live weight increase.	Cost of producing 1 cwt. live weight increase.
	£ s. d.	£ s. d.	£ s. d.	cwt. lb.	£ s. d.
Home-grown . .	129 2 4	176 12 9	305 15 1	112 40	2 14 5
Imported . .	140 14 6	176 12 9	317 7 3	118 72	2 13 6

The results from individual centres show that in twelve instances the daily increase was slightly greater from the imported foods, and in nine cases the advantage was in favour of the home-grown foods.

The results of these two series of cattle feeding experiments may be stated briefly as follows :—

I. Experiment A.—With cattle on grass.

- (a) The average live weight increase made by the two lots was identical.
- (b) The cost of production per cwt. live weight increase differed by 1s. 5d. in favour of the imported foods.

II. Experiment B.—With stall-fed cattle.

- (a) The average live weight increase was one-tenth pound per head daily in favour of the imported foods.
- (b) The cost of production per cwt. live weight increase was 11d. in favour of the imported foods.

Conclusions.—Considered as a whole, the results of these experiments are so closely similar that for all practical purposes it would appear that no superiority can be claimed for either class of concentrated foods at the prices assigned to them in these estimates.

GENERAL SUMMARY.

The principal results of the experiments may be summed up as follows :—

I.—*Pig feeding experiments.*

- (a) Pigs were fattened successfully without potatoes.
- (b) The feeding value of potatoes was rather less than one-fourth that of a mixture composed of two-thirds maize meal and one-third pollard.
- (c) For fattening pigs, maize meal was worth about 10s. per ton more than barley meal.

II.—*Calf feeding experiments.*

Fed to calves along with separated milk, the following meal mixtures gave almost identical results :—

1 part ground flaxseed.	1 part ground flaxseed.
2 parts maize meal.	2 parts maize meal.
2 parts oat meal.	2 parts wheat meal.

III.—*Cattle feeding experiments.*

- (a) Fed to cattle on grass, equal quantities of the following mixtures of foods produced the same live weight increase :—

*Home-grown.**Imported.*

1 part wheat meal.	1 part maize meal.
1½ parts barley meal.	2 parts undecorticated cotton cake.
2 parts ground oats.	

- (b) The undermentioned mixtures of concentrated foods gave almost similar results when fed to fattening cattle in stalls :—

*Home-grown.**Imported.*

1 part wheat meal.	1 part decorticated cotton cake.
1½ parts barley meal.	2 parts maize meal.
2 parts ground oats.	

SUGAR BEET EXPERIMENTS.

I.—GENERAL.

In 1911 the Department commenced a series of sugar beet experiments with a view (1) to comparing the relative yields and quality of roots grown close together in rows on the flat in accordance with continental practice, and of those grown wider apart on drills or ridges so that after-cultivation was facilitated; and (2) to affording information as to the yields of this crop in the state in which it is purchased by sugar factories, *i.e.*, of roots properly topped and cleaned.

Full details of these experiments, which were carried out by Agricultural Instructors at eight centres in seven counties, were published in Vol. XII., No. 3, of the Department's JOURNAL.

The farmers who carried out the experiments in 1911 reported very adversely on the system of growing sugar beet on the flat which is the universal practice on the Continent. They pointed out that such a system of cultivation was more costly, and the crop more difficult to lift than when the beet was grown on drills. On the other hand, under ordinary conditions, factory owners would require the roots to be grown on the flat. In order to ascertain whether the requirements of a sugar factory for roots grown almost entirely below the surface of the soil could be met by cultivating the crop on moulded-up drills, a third plot cultivated in this manner was included in the trials in 1912. Furthermore, in 1912, half of each plot was top-dressed with nitrate of soda to determine its effect on the crop and whether it would prove remunerative.

Apart from the modifications indicated above, the experiments in 1912, conducted at twelve centres in eleven counties, were carried out on the same lines as those of the previous year. For full details and results see Vol. XIII., No. 3, of the Department's JOURNAL.

II.—EXPERIMENTS IN 1913.

The plan of the experiments in 1913 was identical with that of 1912, so that the results obtained during these two seasons enable comparisons to be drawn—(1) between three methods of cultivation :—

- (a) On drills 27 inches wide—the crop being treated much the same as are mangels;
- (b) On drills 27 inches wide—the crop being moulded-up after hoeing, etc.;
- (c) In rows 18 inches apart on the flat;

and (2) as to the yields with and without a dressing of nitrate of soda.

As in previous years, the experiments in 1918 were superintended by the various County Agricultural Instructors. The area of each of the three experimental plots was one-tenth statute acre. The ground intended for the sugar beet was ploughed as deep as, or deeper than, the farmer was accustomed to plough for mangels.

Details regarding the previous crop and system of manuring the beet at each centre are given in the following Table :—

TABLE I.—Showing Manurial Treatment of Sugar Beet Plots, 1918.

Centre.	Previous Crop.	Kind and quantity of Manures applied per statute acre.			
		Farmyard Manure (15 tons).	Artificial Manures (applied at sowing time).	Nitrate of Soda (1½ cwt. applied in two top-dressings).	
		Method of application.		First Half.	Second Half.
Cork (Youghal)	Barley	In drills	1 cwt. Sulphate of Ammonia 3 cwt. Super-phosphate 6 cwt. Kainit	11th July	30th July
Cork (Curraghglass)	Lea Oats	½ in Autumn ½ in drills		20th June	10th July
Londonderry	Oats	*In Autumn		18th June	13th Aug.
Louth	Barley	Early Spring		11th June	26th Aug.
Tipperary, N.R.	Turnips	In drills		5th July	23rd July
Tipperary, S.R.	Lea Oats	In drills	19th June	3rd July	
Carlow	Potatoes	None	1½ cwt. Sulphate of Ammonia 4½ cwt. Super-phosphate 6 cwt. Kainit	11th June	3rd July
Donegal	Turnips			11th July	26th July
Kilkenny	Mangels			15th July	18th Aug.
Mayo	Potatoes			7th July	20th July
Sligo	Kale			†14th July	—
Wexford	Cabbage			9th July	25th July

* 20 tons Farmyard Manure.

† 1 cwt. Nitrate of Soda.

It will be seen from the foregoing Table that at six of the twelve centres, the sugar beet was sown after a green crop and was manured with artificials alone. The quantities of sulphate of ammonia and superphosphate applied in these instances were one-half greater than the amounts of these manures used in conjunction with dung. Kainit was applied at the rate of 6 cwt. per statute acre at all the

centres. In only one case was dung applied to beet following a green crop. At each of the five centres where the beet succeeded a grain crop, dung was applied either some time before, or at the time of sowing the sugar beet.

At eleven centres one-half of each plot was treated with nitrate of soda at the rate of $1\frac{1}{2}$ cwt. per statute acre applied in two dressings after the plants were singled. Through an oversight, only a single application of 1 cwt. nitrate of soda was given at the Sligo centre.

The variety of sugar beet, Klein-Wanzleben Original "Z," which proved so satisfactory in the two previous seasons, was again sown in 1913. This is an improved, early ripening variety, well adapted for growing in districts with an insular climate, or where an early maturing crop is desired. The seed was obtained from the Klein-Wanzleben Sugar Factory Company (formerly Messrs. Rabbethge and Giesecke).

The seed was generally sown at the rate of about 25 lb. per statute acre on the flat plot, but where it was dibbled on this plot, a less quantity sufficed. Less seed was also required on the two other plots. Good brairds resulted in most cases. The plants were singled out to 9 inches apart on all plots, so that on the drills and flat there were, respectively, 16 and 24 plants to every three square yards.

It was again found by the experimenters that an ordinary farm horse was not able to work between the 18-inch rows on the flat without seriously injuring the beet. The American hand-hoe supplied by the Department to each experimenter, therefore, proved very useful for the cultivation of this plot. At some centres these narrow rows were also hoed by yoking a jennet, pony or light horse to a small drill-hoe. The after-cultivation of the crops on the drill plots presented no unusual difficulty. That the plots were well cultivated is demonstrated by the following extracts from Instructors' reports:—"Each plot kept absolutely free from weeds; hoed frequently from sowing time (5th May) until the second application of nitrate of soda (3rd July), and weekly afterwards until the leaves met across the drills." "Plots in drills grubbed and hoed; and plots on flat hand hoed every week throughout the summer; plots kept very clean and free from weeds." "Drills grubbed twice and hand hoed five times; flat plot hand hoed six times."

Owing to wet weather, the sowing of the sugar beet plots was, on the average, fully a fortnight later than in 1912. The crop brairded satisfactorily on all the experimental plots except those at the Counties Cork (Curraghglass) and Wexford centres. From June onwards, the season was warm and dry, and on the whole, favourable to the sugar beet, although in a few instances the crop suffered somewhat from drought. The fine weather greatly facilitated the

TABLE II.—SHOWING RESULTS OF

Name and Address of Farmer with whom the Experiment was located.	Date of Sowing.	Date of Pulling.	Nature of Soil.	PLOT SOWN IN DRILLS.							
				Without Nitrate of Soda.				With Nitrate of Soda.			
				Yield per Statute Acre.		Sugar Content of Roots.	Co-efficient of Purity (apparent).	Yield per Statute Acre.		Sugar Content of Roots.	Co-efficient of Purity (apparent).
				Gross.	Factory Wt.			Gross.	Factory Wt.		
				T. C.	T. C.	%		T. C.	T. C.	%	
1 The Asylum, Carlow,	1913 May 5	1913 Oct. 31	Gravelly	14 19	8 17	15.8	91.93	15 10	8 0	13.8	89.25
2 J. O'Brien, Clonard, Youghal, Co. Cork,	May 20	Oct. 21	Light clay loam	14 9	8 19	12.7	87.92	17 3	8 19	12.7	86.33
3 W. Doherty, Cashel, Carndonagh, Co. Donegal,	May 16	Oct. 25	Deep loam	12 15	8 15	16.2	91.39	12 5	8 4	14.6	87.50
4 D. Loughry, Kilnacow, Co. Kilkenny,	May 28	Oct. 28	Loam	14 17	9 13	12.2	85.00	16 13	11 10	11.8	84.64
5 J. Caske, Drummond, Limavady, Co. Londonderry,	May 19	Nov. 1	Clay loam	8 10	6 0	17.4	92.65	10 19	7 11	15.6	88.92
6 O. Fagan, Littleash, Knockbridge, Co. Louth,	May 26	Nov. 15	Peaty loam	13 2	7 0	15.5	93.46	13 9	7 4	16.2	88.67
7 P. McKay, Kilmeena, Westport, Co. Mayo,	May 20	Nov. 8	Loam	14 10	9 0	12.0	81.81	15 15	11 4	11.6	85.08
8 R. Hunter, Ballinooher, Sligo,	May 17	Oct. 31	Loam	13 13	9 0	16.0	87.25	14 12	9 9	16.4	89.55
9 R. Searson, Mein, Killea, Templemore, Co. Tipperary,	May 26	Oct. 30	Loam	13 10	10 0	14.8	82.89	14 10	10 0	15.3	85.38
10 J. O'Hanrahan, Glenacanna, Ballyporeen, Co. Tipperary,	May 15	Oct. 30	Loam	16 10	12 10	14.3	88.11	17 12	13 7	14.0	88.25
11 *P. Condon, Glengoura, Curraglass, Co. Cork,	May 9 and 10	Nov. 7	Gravelly loam	15 11	10 2	15.1	88.50	15 17	10 9	14.1	86.58
12 *G. Flood, Castleboro', Clonroche, Co. Wexford,	May 16	Oct. 23	Gravelly loam	6 4	4 2	15.2	91.81	7 0	4 9	13.9	88.20
Average of 10 Centres, 1913				13 14	8 19	14.7	88.24	14 17	9 11	14.2	87.86
Average of 11 Centres, 1912				13 17	9 17	18.2	90.66	15 5	10 14	17.9	91.11
Average of 8 Centres, 1911				18 15	14 3	18.2	—	—	—	—	—

* Returns from these centres not included in average results.

† Average of 10 centres.

EXPERIMENTS AT EACH CENTRE IN 1913.

PLOT SOWN IN DRILLS AND MOULDED UP.								PLOT SOWN ON FLAT.									
Without Nitrate of Soda.				With Nitrate of Soda.				Without Nitrate of Soda.				With Nitrate of Soda.					
Yield per Statute Acre.		Sugar Content of Roots	Co-efficient of Purity (apparent).	Yield per Statute Acre.		Sugar Content of Roots.	Co-efficient of Purity (apparent).	Yield per Statute Acre.		Sugar Content of Roots	Co-efficient of Purity (apparent).	Yield per Statute Acre.		Sugar Content of Roots.	Co-efficient of Purity (apparent).		
Gross.	Factory Wt.			Gross.	Factory Wt.			Gross.	Factory Wt.			Gross.	Factory Wt.				
T. C.	T. C.	%		T. C.	T. C.	%		T. C.	T. C.	%		T. C.	T. C.	%			
14 8	9 2	15.7	91.58	15 11	10 6	13.5	89.62	17 0	11 15	17.3	91.62	16 13	12 0	14.0	92.51	1	
12 12	9 17	12.6	86.72	17 11	9 13	11.6	85.53	18 18	13 4	14.7	89.14	22 14	12 19	13.6	88.70	2	
12 10	9 19	14.1	86.75	12 0	9 3	15.4	85.64	14 6	10 18	15.8	80.94	12 15	9 6	14.3	85.26	3	
14 3	11 10	13.9	86.86	17 0	13 9	12.1	84.58	14 7	8 17	15.0	88.89	14 3	9 9	14.2	86.26	4	
8 12	6 1	15.2	91.38	10 10	7 11	16.0	90.45	9 11	7 10	17.6	92.14	11 13	9 1	15.2	90.56	5	
12 15	7 5	14.9	87.11	13 16	7 12	15.2	88.86	13 16	9 6	16.9	89.81	16 7	11 13	17.0	87.04	6	
17 10	12 4	12.4	82.22	18 5	14 15	11.9	81.79	13 0	10 2	13.6	84.72	14 3	10 18	13.5	81.77	7	
14 12	9 18	15.1	88.58	16 3	11 0	14.9	91.36	18 3	13 1	17.0	86.71	19 17	13 14	15.0	88.17	8	
16 0	11 0	13.2	84.21	16 10	12 0	14.5	87.05	16 0	11 0	15.0	87.18	18 0	13 0	15.8	85.25	9	
17 5	13 15	14.8	96.88	18 10	15 0	14.8	88.68	19 14	16 9	13.0	89.89	20 12	16 18	13.9	92.43	10	
14 17	9 18	13.7	87.18	16 7	11 12	14.3	87.23	7 5	4 18	14.8	86.49	9 1	6 11	14.0	86.29	11	
6 8	4 8	13.4	83.73	7 11	4 18	13.0	86.96	6 1	4 2	15.7	88.33	7 8	4 19	12.6	77.42	12	
14 1	10 1	14.2	87.63	15 11	11 1	14.0	87.36	15 10	11 4	15.6	88.10	16 14	11 18	14.7	87.80		
14 2	10 5	18.4	91.21	15 10	11 6	18.3	91.73	13 17	10 10	18.3	91.09	16 6	12 3	18.2	90.75		
—	—	—	—	—	—	—	—	20 8	17 8	18.7	—	—	—	—	—		

after-cultivation of the experimental plots, and made it possible to keep them suitably clean. In no case was the crop damaged to any appreciable extent by insect or fungoid pests. The sugar beet continued to make good growth during September and October. When the crops were lifted at the end of October or early in November, the roots showed little evidence of maturity (yellowing of the leaves, etc.). There was not much difference between the degree of ripeness of the various plots, but those top-dressed with nitrate of soda showed, on the whole, least evidence of maturity.

The lifting of the crop grown on the flat again proved a difficult and slow process. The raising of the beet grown on the ordinary drills and on the moulded-up drills was much easier, simpler and less costly.

The recording of the yields from the various plots was entrusted to the respective Agricultural Instructors, who weighed representative portions, usually the two middle drills or rows of each plot. The tops of the roots were first twisted off and the beet roughly cleaned, much the same as is done with mangels, and in the tabular statement this weight is described as gross weight. The roots were next crowned with a knife and again weighed. Sugar factories, however, pay for their beet on the basis of perfectly cleaned roots, and only for that portion of them which has grown below the surface of the soil. The crowned and roughly cleaned roots were, therefore, finally treated by carefully washing and brushing away all particles of soil, and the tops were cut off to ground-level in order to obtain "factory weight" of the crops.

The Instructors drew a number of beets, twelve or more, thoroughly typical and proportionate as regards size and shape, from the two halves of each plot, and the roots so drawn were sent to the Department's Analyst, who estimated the sugar content of the roots and the purity of the juice by methods in vogue in German beet sugar factories.

In Table II. are given full particulars of the gross and factory weights, and of the analyses of the roots from each plot at each centre, also the average results from ten centres (*i.e.*, at all centres excepting Curraghglass, Co. Cork, and Clonroche, Co. Wexford, where the results were not very reliable).

It will be observed that the average yields of sugar beet from the various plots in 1913 and 1912 were very similar. A comparison of the yields obtained from the ordinary drills and flat plots during each of the three seasons shows, however, that the 1911 returns were markedly superior to those of 1912 and 1913.

The most striking feature of the 1913 experiments is the low sugar content of the roots, the average for all the six plots being only 14.6 per cent. as compared with 18.2 per cent in 1912 and 18.5 per cent. in 1911.

Since the cultivation, manuring and general management of the experimental plots was very similar in each year, it would appear that the differences between the average yields and sugar contents of the beet were due, in a large measure, to the influence of season. Thus, in the exceptionally fine summer of 1911, remarkably heavy crops showing a high sugar content were obtained. In 1912, the beet was sown under fairly favourable conditions, but the crop was retarded by the cold, wet weather experienced in June, July and August, and although it made good growth during the fine weather which prevailed in September and October, nevertheless the average yield was about one-fourth less than that of 1911.

It must be observed, however, that the influence of the unfavourable weather of 1912 was manifested mainly in the reduced yield; the sugar content of the roots was almost equal to that of 1911.

The low sugar content of the 1913 crop in comparison with that of the two previous years' crops was, in all probability, due to the fact that owing to the late sowing the roots did not mature so well as in 1911 and 1912.

III.—SUMMARY, 1911-12-13.

A.—Returns from various methods of cultivation.

Particulars of the gross and factory weight yields and sugar content of the roots, grown without nitrate of soda on ordinary drills and on the flat, during each of the three seasons 1911-13, are given in Table III. below :—

TABLE III.

Year.	No. of Centres.	ORDINARY DRILLS.			ON THE FLAT.		
		Average gross weight per Statute Acre	Average factory weight per Statute Acre.	Sugar content.	Average gross weight per Statute Acre.	Average factory weight per Statute Acre.	Sugar content
		T. C.	T. C.	%	T. C.	T. C.	%
1911	8	18 15	14 3	18.2	20 8	17 8	18.7
1912	12	13 18	10 0	18.1	13 18	10 13	18.3
1913	10	13 14	8 19	14.7	15 10	11 4	15.6
Average of the three Seasons .		15 9	11 1	17.0	16 12	13 2	17.5

From the figures shown in this table it is evident that the better crop in point of yield and also sugar content was that cultivated on the flat, and that, moreover, on the average of the three seasons, the superiority of the beet on the flat would, assuming roots properly topped and washed could be sold at £1 per ton on the farm, more than recoup the extra cost of labour involved in this method of cultivation as compared with growing sugar beet on ordinary drills. The conclusion to be drawn, therefore, is that under Irish conditions it would be more advisable to grow sugar beet on the flat than on ordinary drills.³

In the 1912 and 1913 experiments, plots on moulded-up drills were introduced. A comparison of this method of cultivation with the flat is afforded by the figures given in Table IV.

TABLE IV.—Showing the average yields of Roots, Sugar Content, etc., 1912 and 1913.

Plots.	Average annual yield of Roots per Statute Acre.		Ratio of Factory weight to gross weight expressed as a percentage.	Average Sugar content of roots.	Average co-efficient of purity (apparent.)
	Gross Weight.	Factory Weight.			
	T. C.	T. C.		%	
Ordinary Drills :—					
(a) Without Nitrate of Soda	13 16	9 8	68.1	16.5	89.45
(b) With Nitrate of Soda	15 1	10 3	67.4	16.1	89.24
Moulded-up Drills :—					
(a) Without Nitrate of Soda	14 2	10 3	72.0	16.3	89.42
(b) With Nitrate of Soda	15 11	11 4	72.0	16.2	89.55
On the Flat :—					
(a) Without Nitrate of Soda	14 14	10 17	73.8	17.0	89.60
(b) With Nitrate of Soda	16 10	12 1	73.0	16.5	89.28

From this table it will be seen that, on the average of the two seasons, the flat plots (a) and (b) produced yields (factory weight) only 14 and 17 cwt., respectively, per statute acre higher than the moulded-up drill plots (a) and (b), and that the sugar content of the roots on the former plots was only 0.7 per cent. and 0.3 per cent., respectively, higher than that of the roots on the latter. These increments in yields and sugar content would by no means be sufficient to compensate for the extra outlay in labour on the flat plots. In view of these results, it may be inferred that of the three methods of cultivation, that of moulding-up ordinary drills is best adapted to Irish conditions.

B.—The effect of Nitrate of Soda.

Half of each of the three plots was top-dressed with nitrate of soda at 11 centres in 1912 and 10 in 1913. The average return, for the two seasons from the crops to which this dressing of $1\frac{1}{2}$ cwt. per statute acre was applied, are contrasted with those from the untreated portions in Table IV.

It will be noticed that the average increases in yield (factory weight) due to the application of nitrate of soda were as follows :

On ordinary drills	15 cwt.	per statute acre.		
„ moulded-up „	21 cwt.	„	„	„
„ the flat	22 cwt.	„	„	„

and that, on the average, the use of nitrate of soda slightly reduced the sugar content of the roots—the figures being 0·4 per cent. 0·1 per cent. and 0·5 per cent. respectively, on the several plots. It will also be observed that the use of nitrate of soda has had little, though varying, effect on the purity of the juice.

From the foregoing, it would appear that in this country the application of nitrate of soda to sugar beet, manured as were the 1912 and 1913 experimental plots, would not prove remunerative.

C.—The Ratio of Factory Weight to Gross Weight.

From the particulars given in Table IV. it will be seen that from 68·1 per cent. to 73 per cent. of the sugar beet weighed after being roughly cleaned and having the tops twisted off, represented the yield of the crop in the state in which it would be purchased by a sugar factory. There was little difference in this ratio between the crops grown on the flat and on the moulded-up drills, but the roots from both these plots yielded a higher proportion of factory weight than did those from the ordinary drills.

D.—Relative Yields of Sugar Beet and Mangels.

At the centres where the sugar beet plots were grown alongside mangels, the Instructors also made weighings of the latter crop with a view to comparing the relative yields of mangels and sugar beet. These returns, together with the highest yields of sugar beet at the particular centres, are reproduced in Table V. The table also includes the average yield of mangels in the respective counties for the period covered by the beet experiments.

TABLE V.—Showing the relative yield of Sugar Beet and Mangels.

County.	Sugar Beet per Statute Acre (best plot in each case).		Yield of Mangels (grown alongside Sugar Beet) per Statute Acre.	Average Yield of Mangels per Statute Acre for same County.
	Gross Weight, <i>i.e.</i> , harvested as are Mangels.	Factory Weight, <i>i.e.</i> , roots properly crowned and thoroughly cleaned.		
Average of 3 years 1911-13	T. C.	T. C.	T. C.	T. C.
Carlow	15 15	11 17	34 1	21 10
Cork	20 7	15 2	34 4	20 5
Londonderry	11 8	9 14	23 12	17 6
Louth	16 16	13 8	27 8	21 1
Tipperary	21 6	18 2	27 6	20 9
Average of 2 years 1912-13				
Kilkenny	20 0	15 4	33 10	17 13
Mayo	17 9	13 9	21 16	17 4
1913				
Donegal	14 6	10 18	23 10	18 14
Sligo	19 17	13 14	34 13	18 6
General Averages	17 9	13 10	28 18	19 3

It will be seen from the foregoing table that the average factory weight yield of the *best plots* of sugar beet was less than half the average yield of mangels grown alongside. These comparisons are made on the basis of factory weight of beet, as it would be on such yields, and not on the weight of unwashed roots with crowns, that the crop would be bought by sugar beet factories. In addition to the roots supplied to the factory, the grower would have from two to three tons per statute acre of sugar beet crowns, *i.e.*, the difference, less the soil removed by washing, between the gross and factory weights given in the table.

An inspection of Table V. shows also that the farmers who carried out these sugar beet experiments grew much better crops of mangels than the average for their counties. They must, therefore, be regarded as good tillage farmers; the thoroughness with which they cultivated the sugar beet plots has already been mentioned. The inference to be drawn from these facts is that,

SUGAR BEET EXPERIMENTS, 1912.



Fig. 1.—Hoeing Sugar Beet on the flat, in Co. Wexford, with the American Hand-hoe.



Fig. 2.—Sugar Beet in drills at the Co. Wexford Centre, 1912.

SUGAR BEET EXPERIMENTS, 1912.



Fig. 3.—Sugar Beet from the Co. Wexford Centre, 1912.

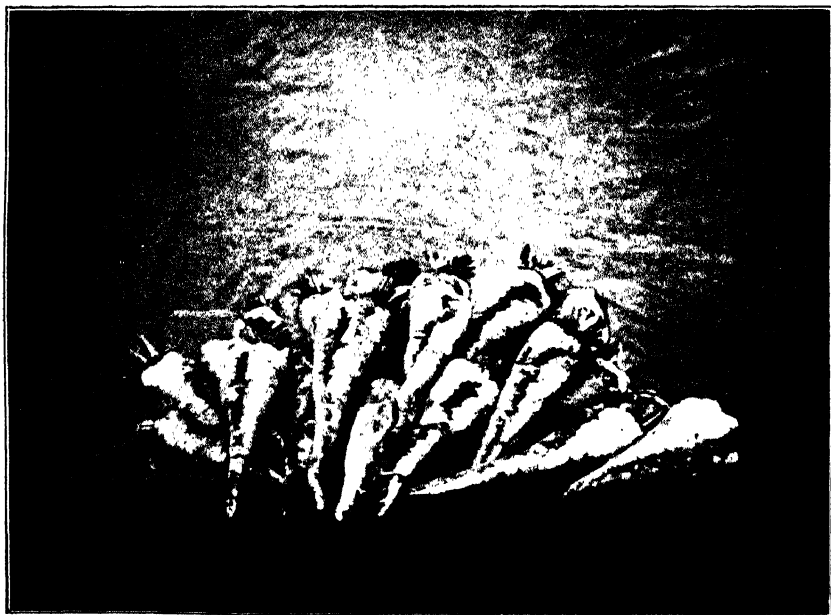


Fig. 4.—Sugar Beet from the Co. Wexford Centre, 1912.

even when cultivated in a thorough and painstaking manner, the factory weight yield of a sugar beet crop in Ireland cannot reasonably be expected to exceed about half the yield of a well managed crop of mangels.

SOME RESULTS.

The experiments carried out in 1911-12-13 have shown that :—

- (1) With proper care and management, crops of sugar beet comparing favourably in yield with continental crops, can be grown in Ireland. For example, in spite of somewhat adverse weather conditions, in 1912 and 1913, an average yield of over 10 tons (factory weight) per statute acre was obtained from the moulded-up drill plots.
- (2) The sugar content of the roots was also satisfactory ; the average in 1911 was 18·5 per cent. ; in 1912 and 1913, the average was 18·2 and 14·6 per cent., respectively.
- (3) Of the three methods of cultivation, the system of growing the crop on moulded-up drills was the best.
- (4) Top dressings of nitrate of soda to beet manured with
 - (a) a moderate dressing of farmyard manure and a complete mixture of artificials (including sulphate of ammonia), or,
 - (b) a rather heavier dressing of the same mixture of artificials without dung,
 was not generally remunerative.
- (5) The factory weight was rather less than three-quarters that of beet roughly cleaned and topped.
- (6) The yields from the best plots were about half those of mangels grown alongside.

These results also indicate the returns (yields and sugar content) which may be obtained with proper care in this country.

The illustrations in this report were prepared from photographs kindly furnished to the Department by one of those who carried out experiments in the year 1912, Mr. J. Borthwistle, Effernogue, Ferns, County Wexford, and they show his crops during the early and advanced stages of growth, and also specimen roots from the plots. In Fig. 1 a man is seen at work with the American hand-

hoe on the flat where the seed was dibbled in the 18-inch rows. This view clearly shows the regular braird and the effect of the hoeing on the surface soil. In this connection it may be mentioned that the use of this hoe has greatly facilitated the cultivation of beet in Germany and other countries, where, so long as the growth of the crop permits, this implement is used, not only between the rows, but also diagonally across them, first when the plants are bunched preparatory to singling, and, subsequent to the singling, between the individual plants in the rows. Fig. 2 gives a view of the drill plots in the month of August, and demonstrates the luxuriant foliage of the crop on the drills. The leaves, however, as may be noticed on the left in the foreground, were not sufficient to cover the ground completely. With regard to this illustration it may be again observed that the sugar beet received no farmyard manure at this centre, but followed a crop (cabbages) for which a liberal dressing of dung had been applied. The growth of this crop, and also that of the crop of 1911 in County Wexford which followed tobacco, fully bear out the recommendation of continental authorities that, where possible, sugar beet should be grown on land to which large dressings of farmyard manure have been applied for the previous crop. Figs. 3 and 4 illustrate specimens from the County Wexford plots in 1912, and show the good general appearance of the beet, which is clean and not forked, though some roots are rather coarse. In Fig. 3 two roots, marked A and B, call for special notice. Root A, though somewhat coarse in character, is nearly a yard long, and this specimen conveys much more clearly than do words how deeply sugar beet grows in the soil when conditions are favourable to such development, and thus demonstrates the necessity for deep and thorough cultivation. It will also be noticed that many other specimens were broken in the lifting. Root B, though perhaps somewhat small, is the desired type of the variety sown, *i.e.*, Klein-Wanzleben Original "Z." It tapers gradually and regularly from the shoulder, and consequently, when trimming (crowning) such a root for factory purposes, there is little waste as compared with the portion which has to be discarded from coarser roots like the two specimens shown at the extreme left and the four at the right hand side of Fig. 3, and several specimens in Fig. 4. The spiral depressions out of which the side-roots arise are also well shown on Root B.

RURAL LIFE CONGRESS IN BELGIUM.

During the present year a congress which promises to be one of exceptional interest is to be held in Belgium ; its object is "the improvement of rural life." The deliberations of the proposed congress should serve to direct public attention to a movement which has been gradually taking shape in recent years and which finds its urban counterpart in the efforts made to forward better town-planning and the provision of healthier and more beautiful surroundings for the city dweller. This rural movement is of recent growth, but nevertheless it has already taken firm root, and is in a fair way to the realisation of some, at least, of its ideals.

There has, indeed, been no lack of effort to improve the conditions of rural life, but that effort has hitherto been directed mainly along practical and utilitarian lines. The need for material reform was recognised long ago, and immense stores of energy and capital have been expended in the movement towards greater rural efficiency. Science has been pressed into service, and it must be conceded that there has been considerable progress towards making agriculture a sound, paying concern. But, until a comparatively recent date, rural æsthetics had not been taken up as an object of serious study. The ugliness of certain aspects of city life was, indeed, readily admitted by most people, but country life had hitherto been accepted as something inherently beautiful and desirable. Such, at least, was the traditional attitude, and it found its complete sanction in the phrase : "God made the country ; man made the town," which conveniently summed up and dismissed the situation.

The notion of beautifying country life, or indeed that such a process might be needful, is thus of quite recent growth. That its reasonableness and its vital importance are now generally recognised is mainly due to the relentless way in which the argument has been driven home by what is commonly called the "rural exodus," in other words, that migration of people from country to town which goes on steadily, and is a source of anxious speculation to rural economists all the world over. The rural exodus provides unimpeachable evidence that all is not well with the conditions of life prevailing in our rural communities.

It is sometimes said that the most striking feature of our modern social organisation is the growth of towns. These have, unfortunately, been allowed to develop in great measure at the expense of the country which, in its turn, has been somewhat cynically described as "the space between the towns." A penalty we pay for this neglect of the country is that disquietingly persistent townward movement of the rural population which is largely

due to the fact that town life is more generally attractive than country life. There always has been, and probably always will be, a movement of the kind, but in its present dimensions it constitutes a grave menace to the social equilibrium. This being so, there is urgent need of a remedy. But how is the problem to be solved? How are people to be retained on the land if they prefer to live in the city? Or rather, how are they to be induced to transfer their preference to the country? The answer, of course, is by increasing the attractiveness of rural life.

How to make rural life attractive—that is the problem that is to be discussed in all its bearings at the coming Belgian Congress. This problem has for some time past been forcing itself upon the attention of statesmen and economists. Much has already been written upon the subject; it has been discussed in many weighty assemblies in both Europe and America. It has been the subject of lectures, conferences and deputations. Facilities for its examination have been increasingly afforded at agricultural shows and exhibitions of all kinds. The movement for the organisation and better equipment of agricultural women, springing up almost simultaneously in many lands, is another manifestation of the same line of thought. The *Pavillon de la Fermière* at the Brussels Exhibition a few years ago* was a practical demonstration of how much can be accomplished by countrywomen in improving the conditions of rural home life. This pavilion met with such success and aroused so much interest and comment both in Belgium and other countries, that the organisers of the recent universal exhibition at Ghent were encouraged to erect an entire model village which, in its turn, has given rise to the Congress now in contemplation. A brief description of the village will suffice to show its connection with the Congress, and how the latter gradually developed from the exhibition of last year.

The *Village Moderne*, as it was called, occupied a space of about ten acres, and consisted of a central square or *grand'place* from which radiated a number of "streets." About the square were grouped the buildings of a more public character, such as the parish hall, the church, the schools, the post office, the burgomaster's house and the village inn. In the streets adjoining were three farm-houses of different sizes—large, medium and small—a labourer's cottage and plot, a market-gardener's house and garden with frames and hothouses, a butter factory, a forge, a carpenter's shop and other buildings of a similar character. All these were

* See JOURNAL, Vol. XI., No. 4, p. 639.

fitted up, so to speak, as working models, and in them all the activities of an actual village community could be seen in progress. The lessons taught by the village were mainly of a practical, educational kind, but the aesthetic possibilities of rural life were by no means forgotten. The buildings combined practical utility as to construction and equipment with beauty and simplicity of design, while well-kept gardens and flower beds and roadside trees were a striking feature of every part of the village.

Notices setting forth the intentions aimed at in constructing the village were displayed on every side. One of these intentions was to evoke criticism and discussion of the exhibits. A considerable volume of such comment—much of it of great practical interest and utility—was received by the board of management. Accordingly the organisers determined to take steps to ensure that the ideas started and the work accomplished by the exhibition might be recorded, and, if possible, made permanent. To this end a committee was formed for the purpose of studying the question of rural life in all its bearings with a view to its improvement and embellishment. The Congress announced for the present year is due to the initiative of that committee.

The “Congress for the Improvement of Rural Life,” as it is called, is the first of its kind. It is not intended to overlap or interfere with the activities of any other agricultural or social organisation, but (in addition to collecting new material) it hopes to utilise and develop what has already been accomplished in regard to the improvement of social and family life in the country. In conjunction with the Congress there will be held an exhibition of diagrams, photographs and documents serving to illustrate the matters under discussion.

The work of the Congress is divided into four sections, dealing, respectively, with general questions, the improvement of the public services, the embellishment of villages, and the betterment of rural life. Membership of the Congress is open to persons or institutions on payment of a subscription of 10 francs.*

In addition to the central organising body, provincial committees for the improvement of rural life will be formed; these committees will help to make the Congress known throughout the country, will recruit members, collect subscriptions and generally assist in the work.

Papers on various subjects will be read and resolutions submitted.

The ground proposed to be covered is a wide one, as may be seen **The Nature and Scope of the Congress.** from the scheme of work which has been outlined for each section. The subjects to be dealt with are as follows:—

* The Secretary of the Congress is M. Léon Verstraeten, 15 Place d'Artevelde, Ghent.

Section I.—General Questions.

1. What is the importance and the place of agriculture in the general economy of the province, and what are the conclusions to be drawn therefrom *in relation solely to the object pursued by the Congress?*

2. What encouragement is offered to agriculture, commerce and industry by the province?

3. Comparison between the benefits bestowed by public authorities on large, as compared with small, municipalities.

4. The needs of farmers in regard to public agricultural bodies.

5. The needs of farmers in regard to other public bodies.

6. Part which might be played by agricultural associations in regard to the object of the Congress.

7. Labourers' housing societies in rural districts.

8. How may industrial workers, townsfolk and poor persons be attracted from towns to rural districts?

9. Various propagandist methods in regard to the improvement of rural life and the embellishment of villages.

Section II.—Improvement of Public Services from a Rural point of view.

1. Railways, light railways, tramways.

2. Roads.

3. Postal, telephonic and telegraphic services.

4. Lighting.

5. Public hygiene.

6. Public relief.

7. Village amusements, games, fêtes, etc.

8. Village inns.

9. Fire brigade service.

10. Security of rural districts.

Section III.—The Embellishment of Villages.

1. Rural æsthetics of a by-gone day.

2. Good taste as applied to farmhouses, rural buildings, enclosures, etc.

3. Good taste as applied to public buildings, schools, churches, cemeteries, etc.

4. Good taste as applied to small towns and villages.

5. Good taste as applied to road making.

6. Good taste in relation to forest and garden.

7. Good taste in relation to clothing.

8. Good taste in rural festivals, etc.

Section IV.—Improvement of Rural Life.

(Writers of papers in this Section are asked to treat questions from the point of view of the farmer and from that of the agricultural labourer.)

1. Food.
2. Labour and how to save it.
3. Small rural industries.
4. What primary and technical instruction may do to inspire a love of home.
5. Agricultural libraries.
6. Moral standard, thrift, habits of luxury, alcoholism, etc.
7. Family life.
8. Relations of farmers with one another.
9. Relations of farmers with their labourers.
10. Relations of farmers with landlords, etc.
11. Conditions favourable to the development of various kinds of association.

The programme, as outlined above, is an interesting one. While presenting many familiar features, it nevertheless breaks new ground in a number of important points, and promises a valuable discussion of subjects which have not yet been systematically dealt with or studied in detail. Its great merit is that it brings together and places in correlation a vast heterogeneous mass of material bearing upon the underlying central problem, how to counter-balance the attraction of the town. The Congress, in thus handling, comprehensively and systematically, the question of rural life, its drawbacks and possibilities, should be in a position to offer, in its findings, a valuable contribution to the solution of one of the most pressing and complicated problems of to-day.

L. S.

FOUL BROOD OR BEE PEST.

It is provided by the Bee Pest Prevention (Ireland) Act, 1908, that "if any person keeping or having charge of bees becomes aware that the bees, or any of them, are affected with the disease known as Bee Pest or Foul Brood, he shall forthwith give notice of that fact to the Local Authority of the district in which the bees are kept; such notice should be given in writing to the Executive Officer of the Local Authority, *i.e.*, the Secretary of the County Committee of Agriculture."

Foul Brood is one of the worst diseases to which bees are subject in this country. It is extremely infectious, and because of the readiness with which it can be transmitted from infected to healthy stocks, it is very destructive, and it behoves bee-keepers to exercise the greatest vigilance in order to keep their apiaries free from it.

The term "Foul Brood" always refers to one of two forms of disease, both of which are very prevalent throughout this country, and are commonly known as "European Foul Brood," and "American Foul Brood."

If a stock becomes affected by foul brood, and prompt and effective measures are not taken to check the progress of the disease, the infection will almost certainly spread to the remaining stocks in the apiary, and eventually lead to their complete ruin, and neighbouring apiaries will probably be infected. It is therefore most important that every precaution should be taken to prevent its introduction, and every effort made to secure its eradication, wherever it has appeared.

A bee-keeper who knows or suspects that foul brood exists in his apiary, should avoid entering any other healthy apiary, and should neither lend nor borrow bee-keeping appliances.

SOURCES OF INFECTION.

The commonest causes of infection are :—

Healthy stocks robbing infected stocks.

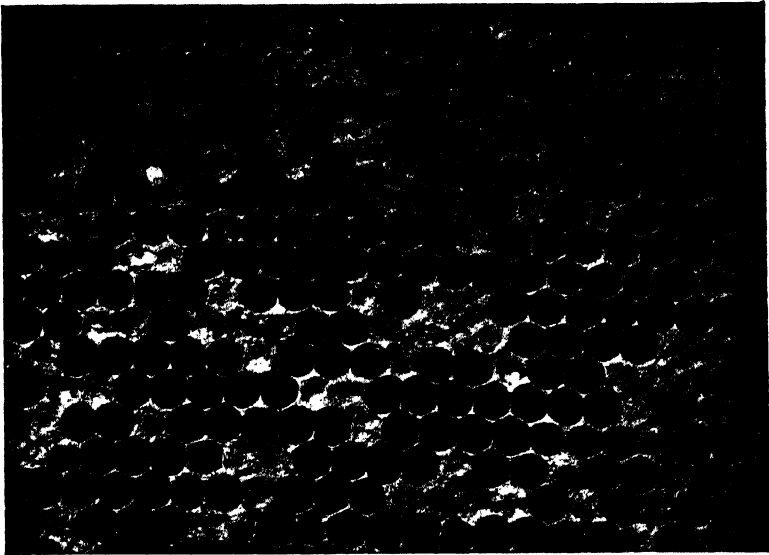
The acquisition of infected swarms, stocks, hives, or other appliances.

The supply to bees of honey, or combs, from an infected stock.

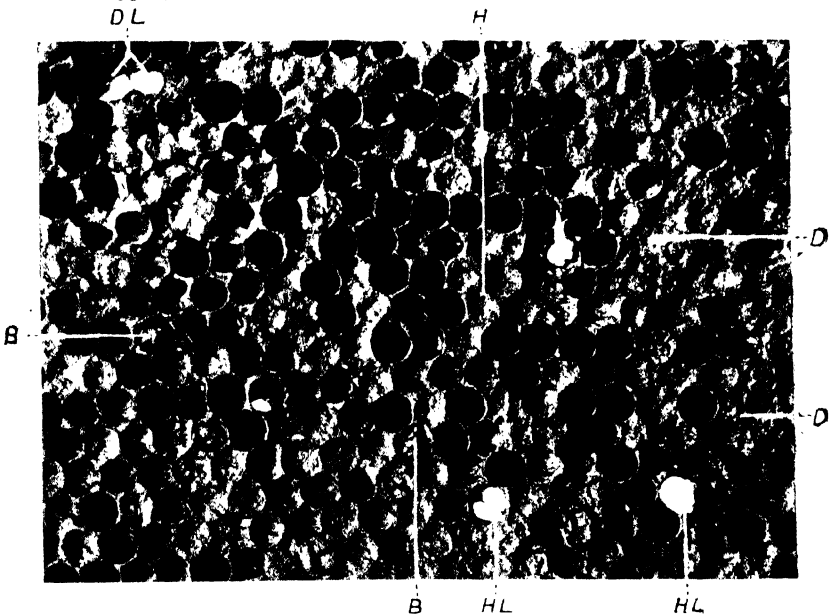
The transfer of frames from an infected to a healthy stock.

Neglect on the part of the operator, after handling an infected stock, to disinfect thoroughly his hands and clothing or such appliances as may have been infected.

FOUL BROOD OR BEE PEST.



1. Portion of a comb affected by foul brood in an advanced stage. The empty cells are those from which healthy brood has been produced, or which have been occupied by diseased larvæ, the remains of which are not discernible in the print. All the capped cells bear the appearance of being diseased. This is indicated by the sunken cappings of the cells, and the numerous perforations in the cappings.



2. Portion of comb affected by foul brood, in a less advanced stage than "1." The raised cappings indicate that there is a good deal of healthy brood, but the presence of diseased brood all over the comb is indicated by the sunken cappings.

H.—A group of healthy cells; other healthy cells being observable all over the comb.

D.—Two groups of diseased cells, of which there are many more.

B.—Healthy bees emerging from their cells.

HL.—Healthy larvæ.

DL.—Diseased larvæ. Note that these larvæ are not lying like the healthy larvæ

Experience proves that the following conditions are specially conducive to the development of the disease :—

Damp and closely-sheltered situations, especially where the hives are much overshadowed by trees, or where they stand on damp ground.

Dirty hives.

Badly ventilated hives.

Hives which admit rain to the quilts.

Weak stocks.

SYMPTOMS.

A frame of brood in a healthy hive has, near its centre, a more or less circular patch of brood. In the cells constituting this brood patch there will be found small grubs or larvæ, the best developed of which present a plump pearly-white appearance, as they lie curled up in the shape of the letter "C" at the bottom of the cells ; but when the disease is present, particularly in its more advanced stages, these larvæ will frequently be noticed lying in various other positions. In the "capped" stage, the capping of healthy brood is usually raised, though sometimes only very slightly so ; rarely sunken ; whereas the capping of diseased brood is usually flatish, sometimes indented, often perforated, and generally darker in colour than that of healthy brood.

Some other readily recognisable symptoms vary somewhat in the "European" and "American" types of disease ; they are as follows :—

European.

Mainly affects unsealed brood.

Larvæ when first affected generally have a yellow spot on the body, near the head.

Dead larvæ are first cream colour, then yellowish, then brownish, and finally almost black.

The cell contents do not become sticky, or but slightly so ; they are rather watery ; and the dead grub gradually shrivels up.

American.

Mainly affects sealed brood.

Dead larvæ are first of a light coffee colour which gradually deepens.

The cell contents become a sticky mass in which the grub is not distinguishable. If a wooden match is inserted into this gluey mass, and then withdrawn, the stickiness of the adhering matter will permit of its being drawn out for half-an-inch, one inch, or more, before it breaks off.

European—con.

The odour in early stages is sourish, but in later stages becomes heavier and more foetid, but the markedly gluey odour of American foul brood is absent.

American—con.

The odour is heavy and foetid, rather resembling that of glue. This gluey odour is a marked symptom.

Chilled brood, which is sometimes mistaken for foul brood, differs from the latter in the following respects. The odours peculiar to foul brood are absent: no bad odour will be perceptible unless a very large patch of brood has been chilled. If the capping of cells containing chilled brood is removed during the breeding season, the dead bees will be found in natural positions, slightly shrunken, black at the head in early stages, and finally becoming black all over. The larvæ turn greyish at first, and afterwards become almost black. Chilled larvæ are not often met with in a strong stock, as the bees will rapidly remove them; a strong stock requiring room, will rapidly remove chilled brood from cells which have been uncapped, whereas they will not usually under similar circumstances remove diseased brood affected by foul brood.

Examination of Brood comb.

If the existence of foul brood is suspected in any stock, the brood comb should be examined when the weather conditions permit of doing so.

If the hive is a fixed comb hive, subdue the bees, invert the hive, and then cut out a triangular section of brood comb, letting the apex of the triangle reach as far as possible into the brood nest. To do this, use a long table knife, and wet the blade. It may be necessary to cut pieces of brood comb out of more than one comb. In any case it is impossible to examine thoroughly the brood comb in a fixed comb hive, except by cutting it all out, and thus doing very serious injury to the stock. It is therefore obvious that, if very little disease is present, it may readily pass undetected in a fixed comb hive.

CURATIVE AND PREVENTIVE TREATMENT.

Cell Treatment.

This treatment cannot be adopted in the case of fixed comb hives, and should be practised only when not more than five apparently infected cells are noticed in the hive.

Uncap the suspected cells, if they are capped, and then by means of a glass dropper, or suitable substitute, such as a wooden match, put two drops of formalin into each infected cell. If formalin is

not available, substitute any other good germicide, but use formalin in preference. This treatment should be continued if other infected cells are noticed later, but if at any time more than five untreated infected cells are noticed, the segregation treatment prescribed below should be adopted.

SEGREGATION TREATMENT.

Two methods of treatment are recommended, viz. :—

- (1) Segregation of artificial swarms taken from infected stocks, followed by segregation of the stocks after the brood has been hatched.
- (2) Immediate and complete segregation of all bees of infected stocks, the brood of which is to be at the same time destroyed.

Treatment No. 1 should only be practised when the stock or stocks to be treated are but slightly affected, and when all the conditions are such that artificial swarming might be successfully carried out, say during May, June, and the beginning of July. The ideal time for operating would be when a stock is so strong, and the conditions are such, that an artificial swarm might be taken without causing injury, and the bees are flying freely in the early part of the day during a full honey flow: subject to these conditions being fulfilled, the earlier the treatment is applied the better.

Treatment No. 2 may be carried out during the period from April to September inclusive, but so far as possible when the weather conditions are favourable and there is a good honey flow: under unfavourable weather conditions very special attention should be given to the directions which follow as to feeding, etc.

It is not advisable to adopt either treatment with less than 3 lb., or about 3 quarts of bees. Weak diseased stocks on the same premises may be united, or a weak stock may be strengthened by adding healthy bees to it. If two such stocks are to be united, care should be exercised to avoid any likelihood of contaminating healthy stocks; therefore the infected stocks should not be moved into or across the line of flight of the healthy stocks: when healthy stocks stand between two diseased stocks which it is desired to unite, adopt treatment No. 2 as described hereafter, but the operation should be performed after bees have ceased flying, and at a place some little distance from the apiary.

The instructions which follow apply to the treatment of stocks in bar frame hives. If the stocks to be treated are in fixed comb hives, the instructions given will have to be modified to suit the special circumstances, but the method of treatment recommended is equally applicable.

These instructions are for those who are assumed to have a fair knowledge of bee-keeping; detailed instructions as to artificial swarming, transferring, feeding, cleaning, and other operations hereafter referred to, are given in "Instructions in Bee-keeping for the use of Irish bee-keepers," to which reference should be made.

Treatment No. 1.

Remove the stock to be treated to a position a few feet behind or to one side of its stand, take an empty box, such as a 28 lb. pyramid butter box or a gin box, an entrance of about three inches by half inch may be cut in it if desired, but this is not essential. place it on the old stand with its entrance at the same height as was the entrance of the parent hive when it was on the stand. Place a hiving board covered by a sheet of paper in front of the box, then find the queen, and carefully carry the frame she is on to the hiving board and shake off the the queen and bees from the frame into the box, which should then be inverted on the stand. If the day is very hot and there is a danger of the queen rising and flying off, it would be safer first to introduce some bees to the box, and then to catch the queen and place her in the box. Elevate the front of the box about $\frac{1}{2}$ to $\frac{3}{4}$ of an inch by wedging it up with wood or stone. All flying bees will now enter the box, and thus create an artificial swarm. It is obvious that the operation here described can only be carried out in the early part of a fine day, when bees are flying freely. If it is intended that the bees left in the old hive shall eventually be united to the artificial swarm which is now in the box, the old hive should be removed to a position about five or six feet to one side of the old stand; but if the stock treated is strong, and the period of treatment sufficiently early to permit of a young queen being mated and of building up two separate stocks, the artificial swarm and the bees left in the parent stock may be treated as two separate stocks, in which case, after the removal of the queen from the old stock, that stock should be moved if possible to not less than fifteen feet to one side of its old stand. If supers were on they should be replaced on the old hive, and cleared, and the sections should then be treated as prescribed further on.

If there is a good honey flow the bees should be left in the box for at least three full days and nights, but if the honey flow is not good, they should be left in the box for 24 hours longer. If there is not a full honey flow, the bees should be plentifully supplied with summer syrup; this is most important, as otherwise they may abscond. When the honey flow is not good, it is advisable to confine the queen by covering the mouth of the box with a sheet of excluder zinc, which may be tied on and left in position until the bees are removed from the box; or, the bottom of the box may be covered

with canvas, tied on, and the box may then be placed in a warm room ; if the box is placed with the canvas upwards, syrup may be supplied by pouring it on the canvas in small quantities at a time ; this feeding must be continued until the canvas is removed. The object of this treatment is to oblige the bees to use up in making wax, the supply of infected food material which they carried when removed from the parent stock. After the bees have been for three or four full days in the box, transfer them to a clean disinfected hive containing frames filled with full sheets of foundation sufficient for the bees, and pack warmly.

If there is not a good honey flow, do not fail to continue feeding with summer syrup ; the success of this treatment depends upon the bees having an ample supply of food, whether natural or artificial, and failure is probable if they have insufficient food.

The brood in the old stock will have hatched out on the 22nd day after the artificial swarm was made ; on that day, or as soon as possible afterwards, transfer the bees from the parent hive to a box, and treat exactly as already prescribed for the treatment of an artificial swarm, but after placing the bees on frames filled with full sheets of foundation, they should be allowed to remain thus for from seven to ten days before they are united to any other stock. The two stocks which have thus been formed may then be united, or treated as separate stocks.

When transferring the bees from the frames of the old hive to the box, the greatest care must be taken to avoid spreading disease germs. The following procedure is recommended. Prepare the soda solution, mixture No. 1. Damp an empty sack thoroughly with petroleum ; have in readiness, two subduing cloths or two sheets of brown paper damped with subduing solution ; spread a large sheet of paper on the hiving board, or on whatever is used instead of a hiving board, to protect it from diseased comb, bees, etc. ; after removing frames from body box, keep them as much as possible over this paper, and as each frame is cleared of bees, drop it into the sack ; when the transfer has been completed, collect all scraps, old dirty quilts, etc., and the hiving board paper with all refuse on it, and throw all into the sack, which should be burnt with its contents ; then at once clear and disinfect the old hive as described further on.

Treatment No. 2.

This treatment is the proper one to adopt :—

- (a) when a stock has been so weakened by disease or otherwise that artificial swarming could not wisely be practised ;
- (b) before May, or after July ;
- (c) when disease is so far advanced that the brood would not be worth saving.

Transfer the bees from the infected stock to a box, and act precisely as prescribed for the treatment of bees transferred from the old hive to a box in treatment No. 1. If any one of two or more infected stocks to be thus treated is too weak to be treated separately, that is, if any such stock is less than three pounds in weight or contains less than about three quarts of bees, it should be united to another stock for treatment. The instructions already given under treatment No. 1 for the treatment of bees while in the box should be carried out and carefully attended to.

DISINFECTION AND DESTRUCTION.

All hives, hive fittings, combs, coverings, articles, and appliances, believed to be possibly infected by disease, or which have been used in a hive which contained a diseased stock, should be treated as prescribed further on, except in the case of stocks in which the disease is so slight that the brood may be subjected to the "cell" treatment already described.

Comb containing capped honey, whether in sections or otherwise, may be removed and stored on the premises for home consumption, in a place to which bees cannot obtain access; otherwise it should be burnt. To avoid spreading disease germs, great care should be exercised in cutting out and removing comb.

Comb which does not contain capped honey nor brood, and which but for the fact that it was in an infected hive would be suitable for further use, may be melted down for wax; otherwise it should be burnt. All other comb not referred to above should be burnt.

If the infected hive is a fixed comb hive, it should be burnt.

Quilts which have been in use in the hive, and all similar hive or super coverings should be disinfected by being boiled for one hour in the soda solution mixture No. 1; otherwise they should be burnt.

In order to avoid likelihood of spreading disease germs when handling infected hives from which the bees have been removed, it is advisable to move such hives for immediate treatment to a shed or store, away from the apiary.

Movable comb hives, exclusive of the comb and quilts, together with all wooden hive fittings which are in them, or which may have been used in them when disease existed on the premises, should be cleaned and disinfected as follows:—

Prepare, as prescribed hereafter, a sufficient quantity of mixtures Nos. 2, 3, or 4, to permit of thoroughly treating therewith every wooden portion of the hive, including the movable fittings belonging to it. If mixture No. 4 is used for the larger parts of the hive, it may be found convenient to use mixture No. 2 for the smaller appliances, which can be boiled.

The directions as to the preparation and application of each mixture should be carefully attended to. All wax, propolis, and other scrapings removed from the hives or appliances treated should be burnt. When the hives and appliances thus treated have dried, every unpainted portion should be thoroughly scorched by means of a painter's blow-lamp, or if a blow-lamp is not available, the scorching may be done by smearing the surface of the wood with petroleum, and *at once* setting fire to it, taking care to turn the hive or other article under treatment, so that every part shall be scorched : the petroleum smear should be applied rapidly, and lighted before it has time to sink into the wood appreciably, that is to say, within at the most two minutes from the time of its application : when thus treated the petroleum will scorch the wood without damaging it. In order that scorching may be effective, the wood treated must be thoroughly dry.

All painted surfaces of the hive should then receive at least one coat of paint.

It is recommended that the frames should be burnt, as the cost of cleaning and disinfecting them would generally exceed their value : if, however it is desired to retain the frames, they should be boiled for half an hour in the mixture No. 2, during which process each frame should be withdrawn to permit of the adhering wax and propolis being thoroughly removed by scraping and brushing with a stiff brush, paying special attention to the under surface of the shoulders and to the grooves, after which the frame should be re-inserted in the boiling solution ; when finally removed from the mixture, wedging slips should be fixed into the foundation grooves, and the frames should be hung up to dry in a cool, shady place ; if exposed to heat they would probably be warped. If the frames do warp, they should be straightened under pressure while drying.

If the diseased stocks have been kept in a shed or beehouse, the latter should receive at least one coat of oil paint or tar, or two coats of limewash ; parts not so treated should be painted over with mixture No. 2, 3, or 4.

When it is necessary to destroy a stock, this should be done by smothering the bees by means of sulphur fumes, and then burning them. This operation should be performed when all bees have returned to the hive. To smother the bees it is necessary to fill the hive with the fumes of burning sulphur ; this can generally be done by one of the following methods :—

(a) When possible remove the hive roof and lift, and closely cover in the body box so as to prevent the escape of sulphur fumes : tilt the body box about one inch at the front, to ensure that all bees shall move up from the floor to the combs : dig a hole in the ground about six inches deep and of less length and width than the base of the hive to be treated : melt about half a pint of flowers of sulphur or lump

sulphur, in any suitable iron vessel, and when it is liquid, run through it brown paper or slips of cardboard cut into strips about three inches wide, and then cut the strips into lengths of about three inches ; split the heads of one or two short pegs, stick them into the bottom of the prepared hole, place a couple of sulphured strips into the splits, light the strips at their lower edges, and immediately place the hive over the hole, pressing its base firmly into the soil and packing it around with earth so as to prevent the escape of sulphur fumes. After ten minutes, rap the sides of the hive sharply so as to cause the bees to drop off the combs ; then remove the hive, and gather up and burn the smothered bees.

(b) If the hive is a movable comb hive, the following method may be adopted if the space in the hive permits :—Half fill a small tin can with red hot turf or coal cinders, stop up the hive entrance, remove the dummy, place the tin or pot behind the back frame, throw a heaped tablespoonful of flowers of sulphur on the cinders, and draw over the quilts so as to prevent the escape of the sulphur fumes. Ten minutes should suffice to smother the bees, after which shake them off the frames on to the floor board and then collect and burn them, and at once cover over the whole with fresh earth, and then burn all combs, frames, etc., as already described above.

(c) Another method, which in some cases may be the most suitable to adopt when dealing with a movable frame hive having a fixed floor board, is to secure the frames in the hive by means of a lath, which may be screwed or tied down, so as to permit of the hive being inverted over the burning sulphur.

Stands which have been occupied by infected hives must be very thoroughly painted over with mixture No. 2, 3, or 4, or at least one coat of tar or of oil paint, or two coats of limewash, should be applied to them all over. Wooden stands which are not thus treated should be burnt. The ground for a distance of five feet to the front and sides of the stand should be dug over, or if that cannot be done without causing injury, it should be heavily coated with freshly slaked lime, or if the surface is of concrete it should be thoroughly treated with mixture No. 2, 3, or 4.

It is also strongly recommended that when an apiary has been badly affected by this disease, the stocks should be moved to fresh sites, as to which read the special instructions on moving hives in "Instructions in Bee-keeping for the use of Irish Bee-keepers."

MIXTURE No. 1.

Soda Solution.

For cleaning hives and appliances.

Proportions—Washing soda, $2\frac{1}{2}$ lb. ; water, 1 gallon.

Place the soda in the water, then boil the water, and apply the solution as hot as possible. If a large enough vessel is available,

the appliances to be treated may be boiled in the solution, all propolis, wax, and dirt, being rubbed off at the same time, by means of a stiff scrubbing brush attached to a wooden lath, or by a metal scraper. If this process cannot be adopted, the hive parts and appliances to be treated, should be placed in a tub or bath, and the solution should be poured on to them from a kettle, this being followed by the immediate application of a brush or scraper to remove all propolis, wax and dirt: the waste solution in the tub may be returned to the boiling pot for future use.

MIXTURE No. 2.

Caustic Soda Solution.

A strong cleansing mixture ; also a germicide.

Proportions—Caustic soda of 98 per cent. purity, 1 lb.

Water 10 gallons.

Put the requisite amount of water into a vessel in which the water can be boiled, and which is large enough to permit of the appliances to be treated being submerged in the water. Add the caustic soda to the water, and then boil the mixture. While the solution is boiling, place in it the appliances to be treated, and boil them for half-an-hour, at the same time removing all wax, propolis and dirt as described under mixture No. 1.

MIXTURE No. 3.

Caustic Soda Solution.

A very strong cleansing mixture ; also a germicide.

Proportions—Caustic soda of 98 per cent. purity 1 lb.

Water, 5 gallons.

This extra strong mixture is intended for cleansing appliances such as hives and crates, which cannot be treated as described under mixture No. 2, because a suitable vessel is not available in which to boil them. Prepare the mixture as prescribed for mixture No. 2, but apply it from a kettle or other suitable vessel, as prescribed under mixture No. 1. The solution run off into the tub or bath in which the appliances are cleaned, may be returned to the boiling pot and used again. Small appliances may be treated by submerging them in the solution in the pot and boiling them for ten minutes, afterwards scrubbing off all adhering propolis, wax or dirt.

Notes as to Mixtures Nos. 2 and 3.

Caustic soda of 98 per cent. purity may be obtained from grocers or druggists in 2 lb. tins for about one shilling.

As both these solutions are very caustic, they should not be allowed to come into contact with the skin, or wearing apparel. The hands should be smeared over with vaseline or grease for protection. If the mixture should fall on the skin, dry the part quickly with a soft cloth, and apply vaseline or grease. Although these mixtures have germicidal properties, they should not be relied on to kill all germs of foul brood ; hence, the hives and appliances when dry should be scorched as already described.

MIXTURE No. 4.*Lime-Soda Paste.*

Cleansing ; also a germicide.

This mixture may be used in lieu of Nos. 2 and 3, if considered more convenient to do so.

Proportions	{ Soft soap, $\frac{1}{4}$ lb.
	{ Washing soda, $2\frac{1}{2}$ lb.
	{ Unslaked lime, $2\frac{1}{2}$ lb.
	{ Water, 2 quarts.

Place the lime in a bucket and slake it by slowly pouring on it rather more than half a pint of cold water ; then cover the bucket with a sack. Put the remainder of the water in a pot with the soft soap ; bring to a boil, and, when boiling, add the washing soda and boil again. Then pour the mixture on to the freshly slaked lime ; stir all together and a thin paste will result, which should at once be applied to the inner surfaces of the hives, and to the other appliances to be treated ; it may be rubbed on with an old brush or a small mop. Be careful to rub it well into every part of the inside of hives and crates. After it has been on for one hour it may be washed off, and the hives and appliances should then be thoroughly cleansed by scrubbing, so as to leave no traces of the paste, or of wax, propolis or dirt.

Copies of this article in leaflet form (No. 48 Revised) may be obtained, free of charge and post free, on application to the Secretary, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion Street, Dublin. Letters of application so addressed need not be stamped.

AN INVESTIGATION INTO THE COMPOSITION OF CHEESE MADE FROM WHOLE MILK.

Difficulty has often been experienced in deciding what is and what is not "Cheese." Cheese, properly so-called, ought to be made from whole milk, and should contain as nearly as possible all the fat in the milk from which it was made. Skimmed and half-skimmed milk cheeses are often described as "cheese," irrespective of the amount of fat they contain, and hitherto it has not been easy to condemn them as there is no standard defining what percentage of fat a whole milk cheese should contain. The difficulty in fixing a standard arises from the fact that the percentage of water varies greatly in different varieties of cheeses, and even, though to a less extent, in cheeses of the same kind. However, by eliminating the water factor and estimating the percentage of fat in the dry matter of the cheese, comparable figures are obtainable, figures which show that it is quite possible to fix a limit below which the percentage of fat in the dry matter of a whole milk cheese should not fall. In order to determine what would be a reasonable figure for this standard, the Department arranged that an investigation should be carried out, and during the period from October, 1911, to June, 1913, samples were obtained from the following places :—Ballyhaise Agricultural Station; Messrs. Daly and Co., Kanturk; Mr. W. G. Eavis, Pilton, Shepton Mallet; Messrs. Newmarket Dairy Co., Newmarket; Shandon Dairy Co., Dungarvan; and the Knockavardagh Co-operative Creamery Co. Only two classes of cheese were tested, viz., Caerphilly and Cheddar, but these may be regarded as fairly representative of semi-hard and hard cheeses respectively, and there is no reason to suppose that other whole milk cheeses would give results differing materially from those obtained in this investigation. In each case a sample was taken of the whole milk from which the cheese was made, and this was immediately sent to be tested along with the sample of the corresponding "green" cheese. A second sample of the cheese was taken when "cured," and this was also tested. The analyses were carried out, first at the Albert Agricultural College, Glasnevin, and afterwards in the Royal College of Science, Dublin.

The methods used in testing the samples were as follows :—

Fat in milk.—This was done by the ordinary acid Gerber Tester.

Water in cheese.—A flat porcelain basin, the bottom of which was covered with a thin layer of asbestos wool, was ignited and weighed, 2-4 grams of the cheese in thin slices were spread on the

asbestos, and the whole dried in the steam oven until it ceased to lose weight (6-6½ hours).

Fat in cheese.—2·4 grams of the cheese were put into a Stokes' tube with 5 c.c. water and 15 c.c. H.Cl. and heated until dissolved. After cooling, the fat was extracted with ether 5 times, the ethereal layer being transferred after each extraction to a weighed flask. The ether was then distilled off and the flask dried in the steam oven until it ceased to lose weight (4-4½ hours).

In all 157 samples of milk, 168 of "green" cheese, and 159 of "cured" cheese were tested. The results are set out in the tables given below, and show that in no case does the percentage of fat in the dry matter of the cheese fall below 47. In the Cheddar cheeses the highest and lowest percentages were 53·54 and 48·72 respectively in the "green" and 52·96 and 48·60 in the "cured," while for the Caerphilly cheeses the corresponding figures are 56·79 and 47·75 for the "green," and 57·15 and 47·11 for the "cured." The average percentage of fat in the dry matter of all the "green" cheese samples is 51·49 and of the "cured" 51·19, while that for all (327) samples is 51·33. The separate averages will be found at the foot of the tables. Taking the figures here found as a basis, one might safely recommend that a percentage of 45 should be taken as the limit below which the fat in the dry matter of a genuine cheese should not fall.

In the tables it will be noted that in some cases the percentage of fat in the milk is not given; this is because the sample was lost in transit. Where the percentage of water and of fat in the cheese is not given, but only that of the fat in the dry matter, the sample had been preserved for a few weeks by the addition of formalin.

Although not actually connected with the object of this investigation, it may be of interest to note what weight of cheese is made from a definite quantity of milk. Calculated from the figures given, the following ratios are obtained:—

- 1 gallon of milk gives 1·300 lb. "Green" Caerphilly Cheese.
- 1 gallon of milk gives 1·239 lb. "Cured" Caerphilly Cheese.
- 1 gallon of milk gives 1·056 lb. "Green" Cheddar Cheese.
- 1 gallon of milk gives 1·000 lb. "Cured" Cheddar Cheese.

CHEDDAR CHEESE.

Date.	Where Made.	MILK.		GREEN CHEESE.				CURED CHEESE.				
		No. of galls.	Per-cent- age of Fat.	No. of lbs.	Per-cent- age of Water.	Per-cent- age of Fat.	Per-cent- age of Fat in dry matter	Date when received.	No. of lbs.	Per-cent- age of Water.	Per-cent- age of Fat.	Per-cent- age of Fat in dry matter
1911								1912				
Oct. 2	Ballyhaise	40	3.7	46	32.30	33.05	48.82	April 2	43	34.15	33.02	50.15
" 2	Kanturk	200	3.8	224	38.86	29.86	48.84	Feb. 12	203	38.37	31.23	50.68
" 4	"	200	3.8	219	39.19	30.51	50.18	" 13	214	35.42	31.52	49.95
" 9	Ballyhaise	30	3.6	39	39.21	30.41	50.02	April 2	35	38.44	31.02	50.39
" 9	Kanturk	200	3.7	228	36.73	31.39	49.61	Feb. 13	217	36.87	31.69	50.20
" 12	"	200	3.85	235	39.07	30.94	50.78	" 13	221	37.20	32.49	51.73
" 16	"	200	4.1	241	38.31	30.29	49.10	" 13	221	35.52	32.45	50.33
" 16	Ballyhaise	25	4.05	34	37.23	31.14	49.61	April 2	31	35.93	32.97	51.46
" 18	Kanturk	200	4.25	236	37.44	32.07	51.26	Feb. 13	225	37.55	31.24	50.03
1912												
April 29	Ballyhaise	143	4.05	139	36.89	32.20	51.02	July 9	127	36.99	32.67	51.85
May 7	"	163	3.4	154	37.68	31.11	49.93	" 9	149	35.93	31.63	49.37
" 14	"	150	3.25	140	37.49	31.44	50.29	Aug. 6	140	—	—	50.90
" 22	"	122	4.0	120	37.21	33.30	53.03	" 16	118	—	—	52.17
" 29	"	154	3.4	147	36.07	30.85	48.72	" 16	143	—	—	49.74
June 4	"	154	No sample	147	37.05	31.26	49.67	" 16	144	—	—	48.70
" 11	"	148	3.4	142	35.92	31.34	48.90	" 16	132	—	—	49.03
" 18	"	145	3.85	138	36.46	31.10	48.95	" 16	131	—	—	48.60
" 25	"	136	3.7	130	36.32	32.82	51.53	Sept. 16	123	—	—	50.67
July 2	"	128	3.45	119	36.79	32.10	50.79	" 16	115	—	—	50.43
" 9	"	125	3.55	115	36.36	32.90	51.70	Oct. 31	112	35.71	32.89	51.14
" 16	"	110	3.55	105	35.57	33.11	51.39	Dec. 10	100	35.83	32.58	50.77
" 23	"	110	3.5	105	36.46	31.98	50.33	Oct. 31	99	37.01	32.06	50.89
" 31	"	105	3.6	105	29.94	36.35	51.88	Dec. 10	97	35.58	33.05	51.31
Aug. 6	"	92	3.8	102	—	—	50.35	" 10	92	36.21	32.63	51.16
" 13	"	115	3.65	115	—	—	49.74	1913				
" 9	Kanturk	225	3.55	230	—	—	50.13	Feb. 28	108	34.89	31.93	49.12
" 6	"	225	3.55	227	—	—	49.26		No sample sent			
" 21	Ballyhaise	100	3.85	107	—	—	51.40	Feb. 28	101	35.2	33.04	50.99
" 28	"	90	3.45	97	—	—	51.35	" 28	91	37.26	32.03	51.05
Sept. 4	"	80	3.7	87	—	—	51.62	Jan. 10	83	37.43	31.88	50.96
" 11	"	68	4.0	77	—	—	50.98	" 10	74	37.80	32.17	51.71
" 18	"	74	3.8	79	—	—	49.94	" 16	75	36.81	31.23	49.43
" 25	"	65	No sample	72	—	—	49.45	" 16	69	36.96	30.80	48.86

CHEDDAR CHEESE—*continued.*

Date.	Where Made.	MILK.		GREEN CHEESE.				CURED CHEESE.				
		No. of galls.	Per-cent- age of Fat.	No. of lbs.	Per-cent- age of Water.	Per-cent- age of Fat.	Per-cent- age of Fat in dry matter	Date when received.	No. of lbs.	Per-cent- age of Water.	Per-cent- age of Fat.	Per-cent- age of Fat in dry matter
1912								1913				
Oct. 3	Ballyhaise	50	3.75	60	40.10	30.38	50.72	Mar. 31	58	39.78	30.80	51.15
" 10	"	40	3.7	46	38.51	30.01	48.81	" 31	45	36.52	31.38	49.44
Sept. 19	Kanturk	160	3.57	176	37.55	32.01	51.26		No sample sent			
" 21	"	160	3.77	177	38.71	31.89	52.04		No sample sent			
" 24	"	160	3.55	177	37.80	31.81	51.15		No sample sent			
Oct. 9	"	160	3.8	174	39.48	30.90	51.06		No sample sent			
" 17	Ballyhaise	30	4.2	40	39.05	31.86	52.27	Mar. 31	37	37.68	32.43	52.03
" 23	"	25	4.47	37	43.66	30.17	53.54	" 31	35	40.62	31.45	52.96
" 31	"	15	3.4	20	39.54	30.16	49.88	April 15	19	41.37	30.53	52.07
Nov. 6	"	35	3.8	41	No sample sent			" 15	40	42.38	28.19	48.92
" 13	"	30	4.5	30	41.55	31.16	51.61	" 15	30	43.31	29.75	52.49
Totals and Averages		5187		5479	37.61	31.57	50.53	—	4097	37.36	31.75	50.60

CAERPHILLY CHEESE.

Date.	Where Made.	MILK.		GREEN CHEESE.				CURED CHEESE.				
		No. of galls.	Per- cent- age of Fat.	No. of lbs.	Per- cent- age of Water.	Per- cent- age of Fat.	Per- cent- age of Fat in dry matter	Date when received.	No. of lbs.	Per- cent- age of Water.	Per- cent- age of Fat.	Per- cent- age of Fat in dry matter
1911 Oct. 4	Pilton .	56	4.0	79	46.38	29.01	54.10	1911 Oct. 18	74	44.64	29.56	53.40
" 10	Newmarket	129	3.7	186	49.98	26.73	53.44	" 23	179	40.74	26.27	52.26
" 12	Pilton .	52	3.8	71	47.17	27.17	51.45	" 24	67	46.97	26.97	50.87
" 17	Newmarket	111	4.05	162	49.42	25.57	50.56	" 30	154	46.51	28.11	52.55
" 19	Pilton .	52	3.95	70	47.83	27.53	52.76	Nov. 1	66	44.34	29.13	52.32
" 25	Ballyhalse	30	4.1	49	50.04	27.43	54.82	" 21	46	47.45	27.80	52.91
" 23	Newmarket	172	3.95	251	48.53	26.36	51.21	" 6	224	47.51	26.69	50.84
" 26	Pilton .	49	4.25	67	47.15	29.13	55.11	" 8	64	46.32	29.15	54.30
" 30	Newmarket	160	3.6	228	49.82	24.59	49.01	" 13	220	47.03	25.67	48.47
Nov. 2	Pilton .	48	4.1	66	49.25	27.83	54.84	" 22	63	47.50	28.17	53.67
" 6	Newmarket	180	4.0	278	51.44	23.52	48.43	" 20	270	46.95	25.99	49.00
" 9	Pilton .	53	4.1	75	48.04	27.10	52.15	" 22	72	48.29	27.91	53.98
" 15	Newmarket	176	3.8	268	49.27	25.88	51.01	" 28	260	47.23	27.80	52.69
" 16	Pilton .	52	3.95	68	49.04	27.58	54.13	" 29	65	48.94	27.20	53.28
" 20	Newmarket	175	3.95	268	51.01	23.68	48.33	Dec. 4	263	49.48	24.32	48.14
" 23	Pilton .	57	3.75	78	49.04	26.76	52.50	" 13	73	47.20	27.71	52.48
" 27	Newmarket	177	4.2	262	51.20	24.56	50.33	" 13	256	49.51	25.46	50.42
" 30	Pilton .	56	3.85	76	49.17	25.62	50.41	" 20	73	43.59	28.65	50.79
Dec. 4	Newmarket	190	4.3	290	50.18	25.35	50.88	" 18	284	46.09	27.26	50.56
" 7	Pilton .	57	4.0	79	49.87	25.87	51.60	" 20	77	43.39	29.45	52.03
" 11	Newmarket	188	4.2	279	50.64	25.31	51.30	" 21	275	48.19	25.71	49.63
" 14	Pilton .	53	3.7	72	44.70	28.36	51.28	1912 Jan. 5	69	46.11	27.64	51.29
" 16	Newmarket	231	4.3	338	49.36	25.95	51.25	" 1	327	47.68	26.52	50.70
" 21	Pilton .	47	3.8	67	46.77	27.71	52.05	" 10	65	47.19	27.48	52.03
" 29	" .	46	3.95	62	49.10	27.65	54.32	" 18	60	44.86	28.80	52.23
1912 Jan. 4	" .	45	4.15	67	46.99	27.96	52.74	" 24	64	47.55	26.47	50.47
" 11	" .	43	3.85	59	48.69	26.73	52.09	Feb. 8	56	45.59	28.57	52.51
" 18	" .	47	No sample	60	48.02	27.14	52.20	" 2	57	46.18	28.31	52.60
" 26	" .	47	4.0	58	49.15	27.19	53.48	" 22	56	49.07	27.42	53.84
Feb. 1	" .	42	No sample	55	48.89	27.56	53.92	" 22	54	47.20	28.79	54.53
" 9	" .	62	3.7	79	46.07	29.09	53.94	" 29	75	44.71	29.90	54.07
" 12	Newmarket	211	3.45	256	47.45	25.74	48.98	" 24	252	47.34	26.49	50.31
" 16	Piltown .	56	3.7	68	45.21	30.14	55.01	Mar. 19	65	40.22	29.68	57.15

CAERPHILLY CHEESE—*continued.*

Date.	Where Made.	MILK		GREEN CHEESE.				CURED CHEESE.				
		No. of galls.	Per- cent- age of Fat.	No. of lbs.	Per- cent- age of Water.	Per- cent- age of Fat.	Per- cent- age of Fat in dry matter	Date when received.	No. of lbs.	Per- cent- age of Water.	Per- cent- age of Fat.	Per- cent- age of age of dry matter
1912 Feb. 19	Newmarket	240	3.6	292	48.70	26.85	52.33	1912 Mar. 2	287	46.49	27.11	50.66
" 22	Pilton	72	4.95	85	44.44	29.44	52.98	" 20	82	31.70	35.27	51.68
" 26	Newmarket	160	3.2	193	50.35	25.88	52.12	" 14	189	47.12	26.81	50.69
Mar. 1	Pilton	70	3.55	78	44.38	30.18	54.25	" 20	74	37.10	33.58	53.38
" 4	Newmarket	141	3.3	164	47.84	26.91	51.59	" 19	159	47.56	26.40	50.33
" 11	"	367	3.2	433	50.48	24.91	50.31	" 25	418	47.92	25.69	49.32
" 18	Pilton	80	3.65	96	47.25	29.00	54.99	" 27	93	45.23	29.46	53.79
" 14	"	80	No sample	94	41.71	31.95	54.81	April 4	90	46.01	30.63	56.72
" 18	Newmarket	154	3.2	185	51.91	25.35	52.72	" 1	177	48.42	26.24	50.87
" 22	Pilton	73	3.85	90	45.14	29.89	54.48	" 12	88	43.65	30.30	53.78
" 26	Newmarket	197	3.25	235	46.41	26.74	49.90	" 10	230	47.95	26.17	50.27
" 27	Ballyhaise	92	4.05	122	49.15	29.09	57.21	" 27	118	44.89	31.27	56.54
" 28	Pilton	92	3.75	106	45.38	28.18	51.59	" 17	102	45.09	27.88	50.78
April 2	Newmarket	220	3.35	268	49.57	25.66	50.89	" 13	257	48.30	25.89	50.09
" 3	Ballyhaise	103	No sample	141	50.58	27.43	55.51	May 4	129	44.31	31.65	56.82
" 4	Pilton	97	3.53	112	46.57	27.60	51.66	April 25	107	45.19	28.37	51.76
" 9	Newmarket	178	3.2	211	50.09	24.57	49.22	" 20	202	49.16	26.00	51.15
" 11	Pilton	97	3.5	118	46.49	28.30	52.88	" 25	116	46.29	28.56	53.18
" 17	Ballyhaise	130	4.2	152	45.64	30.87	56.79	May 11	140	41.03	33.21	56.31
" 16	Newmarket	129	No sample	154	49.21	26.73	52.63	April 27	146	47.85	26.32	50.46
" 18	Pilton	115	3.0	134	45.46	27.95	51.24	May 3	129	42.85	29.31	51.28
" 23	Newmarket	140	3.2	159	50.80	25.44	51.72	" 4	151	45.14	27.98	51.00
" 23	Ballyhaise	115	3.75	140	48.70	27.76	54.11	" 11	130	44.38	29.76	53.50
" 25	Pilton	140	3.7	170	43.78	28.40	50.52	" 10	187	46.29	26.54	49.42
" 30	Newmarket	170	3.2	199	49.42	25.96	51.32	" 11	191	48.56	25.85	50.26
May 2	Pilton	145	3.3	176	46.14	26.78	49.72	" 17	169	46.27	26.98	50.22
" 9	"	175	3.5	199	44.01	28.43	50.79	" 24	192	42.69	28.65	50.00
" 16	"	95	3.5	111	46.22	26.96	50.13	June 3	106	45.58	26.74	49.14
" 21	Shandon	193	3.5	233	46.97	27.65	52.15	" 5	223	43.39	28.40	50.16
" 23	Pilton	95	3.85	115	45.44	26.52	48.61	" 3	110	43.36	27.58	48.69
" 28	Shandon	188	3.2	215	47.20	25.99	49.23	" 11	208	43.92	27.43	48.92
" 29	Pilton	75	3.35	92	49.13	25.18	49.50	" 15	88	46.78	27.14	51.01
June 4	Shandon	194	3.20	230	48.06	25.42	48.94	" 17	225	46.98	25.47	48.03

CAERPHILLY CHEESE—continued.

Date.	Where Made.	MILK.		GREEN CHEESE.				CURED CHEESE.				
		No. of galls.	Per-cent- age of Fat.	No. of lbs.	Per-cent- age of Water.	Per-cent- age of Fat.	Per-cent- age of Fat in dry matter	Date when received.	No. of lbs.	Per-cent- age of Water.	Per-cent- age of Fat.	Per-cent- age of Fat in dry matter
1912 June 6	Pilton . .	80	3.85	99	18.37	25.08	48.58	1912 July 2	96	33.89	32.53	49.21
" 13	" . .	70	3.2	85	18.44	27.22	52.79	" 2	80	42.45	29.73	51.65
" 11	Shandon . .	193	3.35	226	48.04	25.98	50.01	June 25	222	45.77	27.37	50.47
" 18	" . .	193	3.4	228	45.91	27.80	51.39	July 2	218	42.49	29.28	50.89
" 24	" . .	190	3.55	227	47.04	27.34	51.63	" 9	222	43.02	29.53	51.83
" 20	Pilton . .	172	3.70	190	44.38	29.06	52.26	" 2	185	45.88	27.83	51.42
" 27	" . .	158	3.95	192	43.75	28.49	50.64	No sample sent				
July 1	Shandon . .	192	3.3	222	46.39	26.84	50.06	" 17	211	43.63	28.44	50.46
" 8	" . .	190	3.47	217	18.39	26.79	51.90	" 20	206	44.91	28.23	51.25
" 15	" . .	193	3.45	220	41.80	28.56	51.74	Aug. 6	200	—	—	52.55
" 26	" . .	130	No sample	143½	46.00	26.64	49.31	" 12	133	—	—	49.69
" 30	" . .	190	No sample	214½	—	—	52.37	" 26	200½	—	—	51.77
Aug. 5	" . .	190	3.50	225	—	—	52.59	" 26	213	—	—	51.65
" 9	Pilton . .	95	3.70	118	—	—	55.91	" 28	112	—	—	54.96
" 22	" . .	96	4.20	110	—	—	55.45	No sample sent				
" 26	Shandon . .	188	3.45	225½	—	—	50.05	Sept. 9	215	—	—	49.54
Sept. 2	" . .	184	3.55	228	—	—	52.11	" 18	213	—	—	51.33
" 9	" . .	185	3.55	242	—	—	51.21	" 21	230	—	—	50.78
" 16	" . .	183	3.50	236	—	—	51.62	Oct. 2	222	—	—	51.09
" 23	" . .	182	3.85	248	—	—	51.76	" 8	238	45.10	27.06	50.39
" 30	" . .	182	3.60	262	50.47	24.59	49.64	" 16	245	45.92	26.62	49.23
Oct. 7	" . .	180	3.70	252	51.05	24.02	49.07	" 22	240	49.27	25.01	49.30
" 14	" . .	181	3.52	255	50.36	24.68	49.72	" 29	243	47.46	26.25	49.96
" 17	Knockavardagh	300	3.97	431	49.95	26.89	53.72	No sample sent				
" 21	Shandon . .	183	3.95	274	49.94	25.58	51.11	Nov. 5	261	48.53	25.86	50.25
" 24	Knockavardagh	300	4.47	440	49.56	26.88	53.28	" 12	437	48.09	28.02	53.97
" 28	Shandon . .	178	3.7	254	50.59	25.61	51.82	" 16	238	47.43	27.22	51.78
" 31	Knockavardagh	347½	No sample	523½	47.32	27.75	52.67	" 20	507½	46.90	27.83	52.41
Nov. 4	Shandon . .	182	3.62	268	48.21	27.10	52.32	" 26	249	44.02	29.25	52.25
" 7	Knockavardagh	157½	3.87	245½	49.51	26.97	54.47	Dec. 2	232½	45.61	29.86	54.90
" 11	Shandon . .	183	3.95	272	51.30	26.27	53.94	" 2	254	47.99	26.96	51.83
" 14	Knockavardagh	163½	4.60	250	48.24	28.10	54.28	" 2	241½	46.45	28.77	53.73
" 20	Ballyhaise . .	32	4.3	55	47.73	28.11	53.78	" 17	44	46.41	28.52	53.21

CAERPHILLY CHEESE—continued.

Date.	Where Made.	MILK		GREEN CHEESE.				CURED CHEESE.				
		No. of galls.	Per- cent- age of Fat.	No. of lbs.	Per- cent- age of Water.	Per- cent- age of Fat.	Per- cent- age of Fat in dry matter	Date when received.	No. of lbs.	Per- cent- age of Water.	Per- cent- age of Fat.	Per- cent- age of Fat in dry matter
1912								1912				
Nov. 23	Knockavardagh	153	4.5	233½	47.74	28.32	54.19	Dec. 23	227	46.62	29.18	54.66
" 25	Shandon	62	4.0	92	51.10	25.08	51.39	" 13	88	48.32	26.34	50.98
" 27	Ballyhaise	30	4.8	54	49.87	26.46	52.79	1913				
" 30	Knockavardagh	173½	5.0	264	47.20	29.10	55.12	Jan. 3	41	45.17	29.70	54.16
Dec. 2	Shandon	80	3.8	105	52.18	24.56	51.36	1912	No sample sent			
" 7	Knockavardagh	156½	4.5	232	48.86	28.09	54.94	Dec. 12	98	50.43	24.74	49.91
" 9	Shandon	85	No sample	116	50.44	25.44	51.34	1913	No sample sent			
" 4	Ballyhaise	20	3.6	37	50.74	26.80	54.41	Jan. 2	107	46.60	26.95	50.47
" 11	"	40	3.55	54	47.71	27.01	51.71	" 3	34	47.20	28.26	53.51
" 16	Shandon	62	3.8	75	49.19	26.70	52.55	" 7	50	50.61	26.37	53.42
" 18	Ballyhaise	25	3.95	46	46.87	28.48	53.60	" 3	71	47.93	26.51	50.92
1913								" 7	40	47.40	27.61	52.50
Jan. 7	Shandon	62	3.1	80	50.42	25.06	50.54	" 29	76	47.10	26.39	50.18
" 13	"	129	3.2	157	48.25	25.89	50.03	" 30	149	47.66	26.06	49.76
" 20	"	125	No sample	144	49.14	26.32	51.76	Feb. 4	138	48.07	26.63	51.29
" 27	"	128	3.7	155	49.21	21.39	48.02	" 11	150	47.93	26.25	50.04
Feb. 10	"	180	3.2	220	48.84	25.00	48.87	Mar. 1	216	44.54	26.86	48.44
" 17	"	180	2.55	209	49.41	24.93	49.29	" 5	198	45.81	27.95	49.92
" 24	"	180	No sample	208	48.20	24.87	48.02	" 11	198	45.16	25.89	47.28
Mar. 5	"	182	3.0	218	48.78	25.44	49.66	" 26	208	45.95	26.59	49.20
" 10	"	180	2.2	217	48.68	24.98	48.68	" 26	205	46.07	26.44	49.04
" 18	"	180	3.0	219	48.34	24.66	47.74	April 1	210	45.34	25.76	47.11
" 24	"	175	3.0	206	50.57	24.93	50.43	" 8	196	47.35	26.38	50.11
" 31	"	180	2.70	211	50.05	24.40	48.85	" 15	200	48.00	25.43	48.90
April 21	"	180	3.2	212	46.95	26.75	50.43	May 5	201	45.50	27.18	49.87
" 28	"	179	2.8	211	49.29	24.21	47.75	" 13	200	—	—	48.22
May 12	"	180	3.0	215	—	—	48.10	" 31	194	—	—	48.25
" 5	"	180	3.0	219	Sample mouldy			" 17	207	—	—	48.16
Totals and Averages		17040		22061	48.27	—	51.77	—	19932	45.00	—	51.37

MUNICIPAL TECHNICAL SCHOOL, NAVAN.

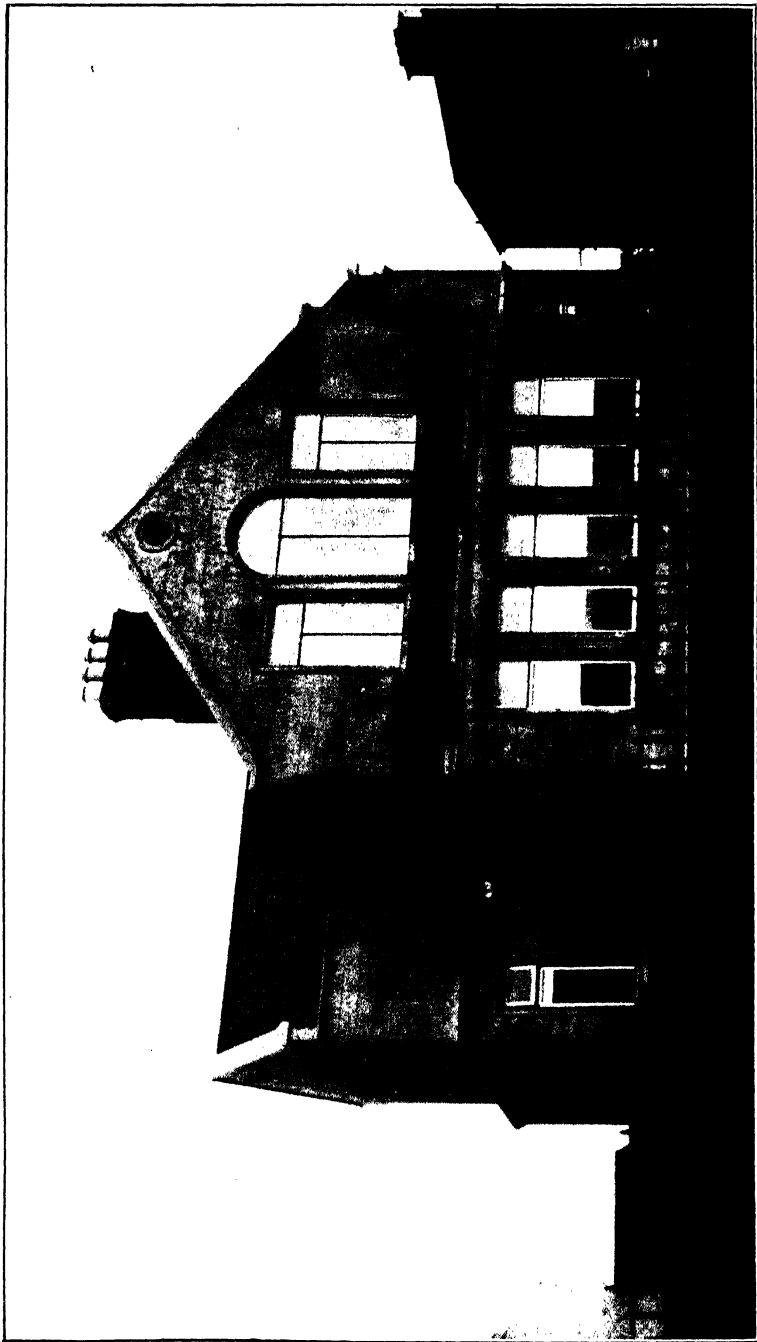


Fig. 1.—Elevation.

TECHNICAL INSTRUCTION IN IRELAND.

[*.* *The following is the fifteenth of a series of articles which has been appearing in the JOURNAL on some recently established Technical Schools in Ireland. These descriptive articles relate to centres differing widely in population and needs, and it is believed that they will be of interest and value in view of future developments in towns in which permanent buildings have not yet been provided. Five of the articles dealt with buildings already erected, but adapted to meet the needs of Technical Schools in Ballymena, Queenstown, Newry, Newtownards, and Clonmel.* Eight of the articles dealt with the Belfast Municipal Technical Institute; the Technical School, Ballymoney; the Central Technical Institute, Waterford; the Municipal Technical School, Dundalk; the Municipal Technical School, Londonderry; the Municipal Technical School, Bangor, Co. Down; the Municipal Technical School, Limerick; the Crawford Municipal Technical Institute, Cork, and the Municipal Technical School, Larnæ.† These buildings were new. The article below relates in like manner to a new building—the Technical School, Navan.]*

TECHNICAL INSTRUCTION IN NAVAN.

BY J. J. GALLEN,

Secretary of the Meath County Committee of Agriculture and of the County Joint Committee of Technical Instruction.

PART I.—INTRODUCTORY.

Navan, a progressive little urban centre of slightly under 4,000 inhabitants, is situated practically in the centre of the fertile grazing County of Meath, at the junction of the rivers Boyne and Blackwater. The principal industries are woollen manufactures, saw milling and furniture-making, and grain milling.

Navan has the advantage of two lines of railway—the Great Northern from Dublin *via* Drogheda to Oldcastle, and the Midland Great Western from Dublin to Kingscourt—passing through the town. The nearest seaport is Drogheda, about seventeen miles distant.

* See issue of the Department's JOURNAL for January, 1908, Vol. VIII., No. 2, page 260; April, 1908, Vol. VIII., No. 3, page 465; October, 1908, Vol. IX., No. 1, page 76; April, 1911, Vol. XI., No. 3, page 462; and July, 1911, Vol. XI., No. 4, page 687.

† See issue of the Department's JOURNAL for April, 1907, Vol. VII., No. 3, page 457; for July, 1907, Vol. VII., No. 4, page 652; for October, 1907, Vol. VII., No. 1, page 11; for July, 1908, Vol. VIII., No. 4, page 666; for October, 1910, Vol. XI., No. 1, page 32; for October, 1911, Vol. XII., No. 1, page 41; for April, 1912, Vol. XII., No. 3, page 532; for July, 1912, Vol. XII., No. 4, page 720; and for Vol. XIII. No. 1, p. 60.

PART II.—HISTORICAL.

Before giving a description of the new Technical School, it may be of some interest to relate the circumstances which led up to its erection.

On the 19th November, 1906, the Navan Urban Council decided to levy a rate of 1*d.* in the £ for the purpose of having the County Scheme of Technical Instruction extended to the Urban District. Up to this time the Technical Instruction Committee, which was formed after the passing of the Agricultural and Technical Instruction (Ireland) Act of 1899, was a Joint Committee, representative of the Meath County Council and the Urban District Council of Kells. Immediately after striking the rate for Technical Instruction purposes, the Navan Urban Council was granted a representation of five members on the Committee. In the following year Trim Urban Council provided a rate of 1*d.* in the £ for the extension of the scheme to Trim, and the Trim Council is now represented on the Committee by two members. The Committee is thus a Joint Committee representative of the Meath County Council and the Urban District Councils of Kells, Navan and Trim. The Chairman is Col. Sir. N. T. Everard, Bart., H.M.L.

Early in 1907 steps were taken by the Committee to secure the use of a building in Navan to serve temporarily as a technical school. Offers of three disused buildings were received, and these buildings were inspected by Mr. Smail, Department's Inspector, and by the Secretary to the Committee. As a result of this inspection a building in Ludlow Street, formerly used as a provision store, was recommended as the most suitable and central. The building had a shop-front and three large rooms at the rear, which were afterwards used as Manual Instruction, Commercial, and Domestic Science classrooms. A lease of these rooms was obtained for a term of three years at a yearly rent of £20, and was afterwards extended for a further period of three years. Some slight structural alterations were carried out to the rooms at a cost of £25 and they were equipped at a cost of about £150.

In preparing a scheme of Technical Instruction for the urban centre the Committee had the object in view of bringing within reach of the boys and girls and young men and women of the town, courses of study suited to local industrial conditions. In this policy they had the co-operation of a local Committee appointed by the Navan Urban Council, as well as the assistance of the Department's Inspectors.

When the scheme was prepared a public meeting was held in Navan and a lecture on Technical Education, which aroused con-

siderable local interest in the Committee's work, was delivered by Mr. Fletcher, Assistant-Secretary for Technical Instruction.

The first session opened on the 1st October, 1907, and the Manual Instructor and one of the Domestic Economy Instructresses, already in the employment of the Committee, gave two days per week each to the work of teaching at the School. The Department very kindly placed at the disposal of the Committee the services of a specially-qualified Commercial Instructor for two days per week. Each instructor conducted two classes daily.

PART III.—SCHEME OF INSTRUCTION.

The following courses of study were organised for the Urban centre, under the Department's Programme for Technical Schools, viz. :—

I. Introductory Course, including :—English, Mathematics, Drawing, Manual Instruction, and Domestic Economy.

Specialised Courses—

II. Commercial, 1st, 2nd and 3rd years' courses.

III. Woodwork and Applied Science, 1st, 2nd and 3rd years' courses.

IV. Domestic Science, 1st, 2nd, and 3rd years' courses.

The following is a record of the individual students enrolled and of the class entries :—

			Students Enrolled.	Class Entries.
1st Session, 1907-8	..	..	189	358
2nd do. 1908-9	..	..	140	321
3rd do. 1909-10	..	..	145	323
4th do. 1910-11	..	..	129	286
5th do. 1911-12	..	..	175	339
6th do. 1912-13	..	..	160	323

After the first session the class entries, though not so numerous, were made up of a better type of student, and the progress made in all the classes was more satisfactory.

During the last session the students enrolled and the class entries in the various classes were as follows :—

			Students Enrolled.	Class Entries.
Introductory Course Classes	..		35	87
Commercial do.	..	..	54	100
Woodwork and Applied Science Classes			17	33
Domestic Science Classes	..	..	54	108

The occupations of the students attending during the last session were as follows :—

	Young Men.	Young Women.
Persons engaged in farming occupations ..	1	—
Building Trades, including Wood-workers, etc.	4	—
Domestic Servants	—	12
Civil Engineers	2	—
Printing Trades	1	—
Dressmakers, Milliners, etc.	—	15
Plumbers	1	—
Furniture makers, etc.	9	—
Salesmen, Warehousemen, Shopkeepers, etc.	8	—
Textile Industries, Designers, Weavers, etc.	—	4
Clerks in Commercial Offices	9	1
Bank Clerks	1	—
Assistant Teachers	3	1
Workers in Lace Making	—	2
Saleswomen	—	4
Boys just left School or College	11	—
Girls just left School or College	—	14
Occupations not included in above classes	9	14
Still in attendance at School or College ..	10	10
No occupations stated	11	3
	—	—
Totals, ..	80	80

[PART IV.—THE BUILDINGS—OLD AND NEW.

The old premises, though never designed for a school, served their purpose fairly well, but the approaches to the classrooms were unsightly and, still more important, the sanitary accommodation was inadequate.

Such an arrangement could, from its nature be only, temporary, and the reports of the Department's Inspectors from time to time brought forcibly before the Committee the necessity for a new building, but the question of cost was difficult to meet. The Committee, having no borrowing powers and very little surplus funds, were unable to carry out the recommendations contained in the Inspector's reports; they, however, referred the matter to the Navan Urban Council, at the same time strongly urging the necessity for a suitable building, and pointing out the methods that might be adopted to secure a loan for the purpose.

The Urban Council immediately afterwards, at their meeting on

This architectural floor plan depicts a building with several rooms and associated plumbing fixtures. The layout is as follows:

- Top Section:** A **STORE** room is located at the top left. To its right is a **2 S JOISTS OVER** area, which includes a **WATER** supply and a **GULLY RMP** (Rainwater Manhole).
- Central Section:** A large **CLASS ROOM** occupies the center-left, with a **MANUAL INSTRUCTION** area below it. To the right of the manual instruction area is a **HALL** containing a staircase. Further right is another **CLASS ROOM**, and at the far right is a **COMMERCIAL SUBJECTS** room with a width dimension of **24' 0"**.
- Bottom Section:** A **LAVATORY** is located at the bottom left, containing **URINALS** and **W.C.** (Water Closet). To its right is a **HALL** with a **CLOAKS** area. At the bottom right is a **W.C.** and a **GULLY RMP**.
- Plumbing and Drainage:**
 - A **DISCONNECTING TRAP** is shown on the left side, connected to an **INSPECTION CHAMBER** and a **DRAIN**.
 - Various **GULLY RMP** (Rainwater Manhole) and **W.C.** (Water Closet) fixtures are indicated throughout the plan.
 - Dimensions for the main rooms are provided: **20' 0"** for the leftmost section, **16' 0"** for the central section, and **24' 0"** for the rightmost section.
- Orientation:** A compass rose is located on the left side of the plan, indicating North (N) and South (S).

Fig. 2. Ground Plan.

MUNICIPAL TECHNICAL SCHOOL, NAVAN.

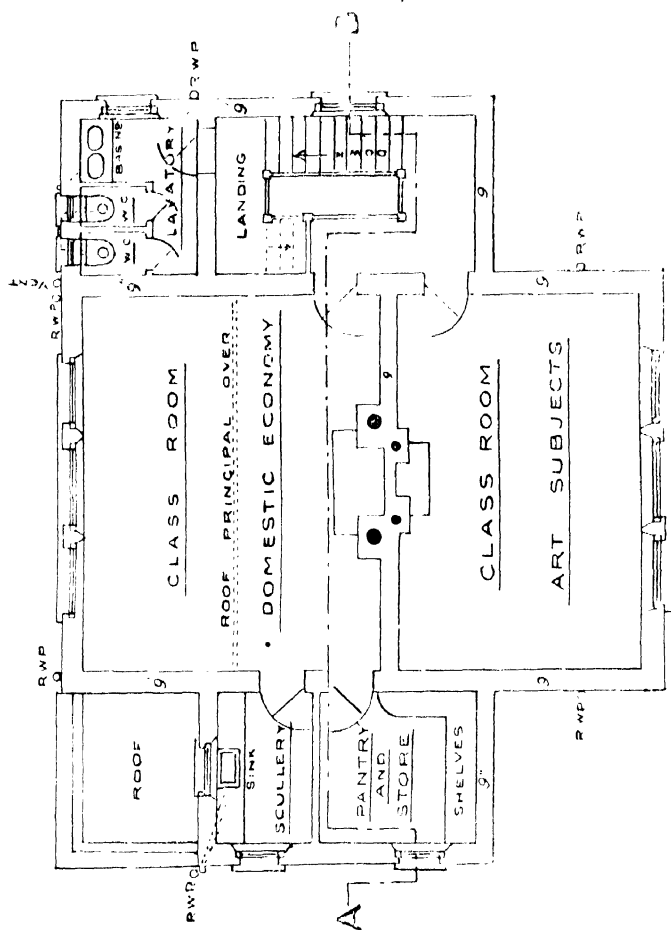


Fig. 3.—Upper Floor Plan.

the 25th October, 1910, unanimously decided to guarantee the proceeds of a rate of 2d. in the pound as security for a loan from the Office of Public Works for the building of a new school. Navan is, so far, the smallest Urban Council in Ireland to undertake to raise a rate of 2d. in the pound, or the full limit allowed by Statute, for Technical Instruction purposes. In addition, the Council provided, free of charge, on their own plot of land in Railway Street, adjoining the new County Hall, a magnificent site for the school.

The proceeds of a rate of 2d. in the £, levied over the Urban District, was only sufficient to secure a loan of £900, but the County Committee augmented this sum by a grant of £100 from their own surplus funds. The balance was obtained from one of the local banks on the personal security of a few members of the Urban Council.

The Local Government Board held an enquiry as to the necessity for the building, and the loan of £900 was obtained from the Office of Public Works at 3½ per cent. interest, repayable in annual instalments extended over a period of forty years. The services of a local architect, Mr. R. Barnes, C.E., were requisitioned for the purpose of drafting plans and specifications. Having these completed, tenders were invited, the contractor being required to provide all labour and materials. The lowest tender received was that of a local contractor at £986 1s. 11d. This was accepted, and building operations were commenced immediately.

As regards the building, the Committee were faced at the outset with the problem of securing the requisite number of rooms of the necessary size at the absolute minimum of cost. Accordingly, utility had to take precedence of architectural beauty. The School is a two-storey structure. The walls are solid brick-work, faced externally with cement, relieved somewhat by ornamental architraves, and roofed with first quality blue Bangor slates. The coping to gable walls is cast concrete, the chimney stack red moulded facing brick, and the ridges are covered with red pole tiles. Rolled steel joists and iron principals insure a sound and permanent structure. The interior walls are plastered and set in white.

It is unnecessary to go into architectural technicalities, as the type of building and the accommodation provided will be evident on referring to the photograph of the exterior and of the ground and first-floor plans which accompany this article. On referring to these it will be seen that, as far as possible, the necessary principle of providing the greatest possible wall space for blackboards, charts, etc., consistent with the adequate lighting of the rooms, has been adopted.

The building has two main entrances from the front—one on the left wing and the other on the right. The entrance on the left is intended mainly for the rooms on the ground floor, but access may be gained from this entrance to the rooms on the first floor by passing through the Commercial classroom, which has a door at each side.

On the ground floor are the Commercial Room, Manual Instruction Workshop and store, and the men's lavatories.

The Commercial Room, which has a floor space of 24 ft. by 16 feet, occupies the front central portion of the building and has five large windows facing West.

The Commercial Class Room. The Manual Instruction Workshop, having a floor space of 24 feet by 20 feet, occupies the rear central portion of the building, and has five large windows facing East. Off the south-east corner of this room is a store, 11 feet by 10 feet, with a door opening to the rear of the premises and a window facing South. This store holds class materials and some of the larger specimens of students' work in course of construction.

At the end of the Hall leading from the left entrance are the men's lavatories.

In the Hall, entered from the right main entrance, is the staircase, which is in two flights.

On the first floor are the Domestic Science Room with pantry and scullery, and a spare room, which is described as the Art Room. The Domestic Science Room has a floor space of 24 feet 10 inches by 20 feet 10 inches, and occupies the rear central portion of the building on this floor. There are three large windows in this room facing East, and one window each in the pantry and scullery, both facing North.

The Art Room occupies the front central portion of the upper storey. It has a floor space of 24 feet 10 inches by 16 feet 10 inches and three large windows facing West. This room is intended for the accommodation of any additional classes that may be organised under the scheme. It is as yet unfurnished.

The rooms are all heated by fire grates of a low pattern, specially designed for heating large rooms. They are fitted with cast mantels of an ornamental design.

Heating and Lighting. In specifying for electric mains to the new County Hall, the County Council kindly provided for cables sufficiently powerful to light the building and to supply the

MUNICIPAL TECHNICAL SCHOOL, NAVAN.



Fig. 4.—Domestic Science Room.

MUNICIPAL TECHNICAL SCHOOL, NAVAN.

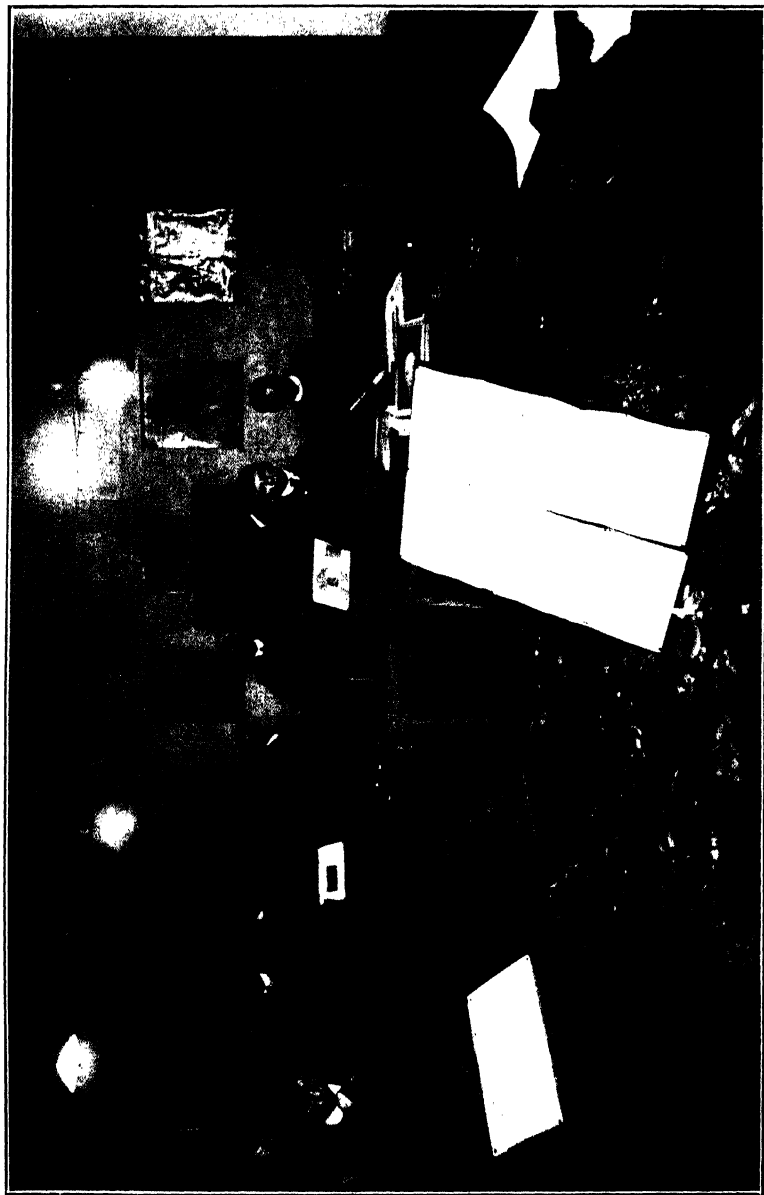


Fig. 5.—Manual Instruction Room.

requirements of the School. Short cables connect the School with the mains outside the County Hall.

Electric current at a pressure of 220 volts is supplied by Messrs. John Spicer & Co., Ltd., from their Flour Mills in the town, at the rate of 4½d. per unit. Osram lamps are fitted on balanced pendants, which may be raised or lowered as required. Each lamp is on a separate switch, and not more than three lamps are on any one fuse.

All the equipment in use at the old School was transferred to the new building. The Commercial Room, which is

Equipment. used by the Commercial and Irish Classes, and the Practical Mathematics Classes conducted by the Manual Instructor, is equipped with twenty-one folding desks with a chair for each desk. These are suitable desks for a small school as they occupy small space and when folded may be placed in a convenient position. A large Teacher's desk and a lock-up press, specially designed to hold drawing boards and mathematical instruments is also provided. The room is lighted by three 32-candle power electric lamps.

The Manual Workshop equipment consists of nine work-benches, each of which is fitted with two Parkinson's instantaneous grip vices and accommodates two students working at the same time. One lock-up tool rack with a double set of tools is provided for each bench. There are also lock-up presses for sundry tools and class materials and an iron-mounted grindstone.

On the walls are charts and specimens of wood carving, which improve the appearance of the room. It is lighted by six 32-candle power electric lamps.

The Domestic Science room is equipped with the necessary supply of cooking utensils and laundry appliances, and has 3 large kitchen tables, 22 chairs, 1 large dresser, 2 lock-up presses, 1 mangle, 3 sewing machines, 1 large gas cooker, 1 close Eagle range with double oven and fire-lifting arrangement, 1 high-pressure copper toe boiler, and one 30-gallon copper cylinder, which provides an adequate supply of hot water for the kitchen and also for the lavatories.

All the equipment in this room was transferred from the old building with the exception of the Eagle range, boiler, and cylinder, which were newly purchased by the Committee at a cost of £20. The room is lighted with six 32-candle power electric lamps, and the pantry and scullery have one 16-candle power lamp each.

A sink with draining board and hot and cold water supply is fitted in the scullery, and in the pantry shelves are fixed to hold class materials and sundry cooking utensils.

The Art Room is lighted by three 32-candle power electric lamps, and the stairs, halls and lavatories are well lighted.

A 50-candle power electric lamp is fixed over each of the outer doors.

The lavatory fittings are Shanks' patent, two large wash-hand basins with hot and cold water supply are provided for each of the lavatories.

The floors of the men's lavatories and of the two halls are laid with Peak's first quality red and blue tiles laid diagonally on a Portland cement concrete floated bed. The floor of the Manual Workshop Store is formed of Portland cement concrete. All other floors in the building are of $1\frac{1}{2}$ inch St. John's prepared T. & G. batten flooring, laid on joists 9 inch by 2 inch.

The ceilings are all of fibrous plaster set white, with the exception of the ceiling of the Domestic Science classroom which is of $\frac{3}{4}$ inch rebated and V-jointed sheeting.

Each classroom is well ventilated, the top portion of the windows being hinged and fitted with quadrant opening gear. Air flues are provided which finish at an air grid under the projecting course in the chimney stack. The ceilings over the rooms on the first floor are perforated, and a louvre ventilator is fitted in a circular opening in each gable.

The School was formally opened by Lady Everard, Vice-Chairman of the County Committee, on the 29th September, 1913, and in the unavoidable absence of the Right Hon. T. W. Russell, Vice-President of the Department, a lecture on Technical Education was delivered by Rev. T. A. Finlay, S.J.,

The cost of the School and equipment was as under :—

Building Contract	..	..	..	£986	1	11
Plumbing contract	..	..	..	50	0	0
Electric wiring contract	..	..	..	45	17	6
Piers, gates, railings, etc.	..	..	..	39	5	10
Labourers' time laying gravel walks, etc.	..			4	0	0
Grates and mantels	..	..	..	6	12	9
L.G.B. Inquiry	..	..	..	3	8	6
Mortgage fees	..	..	..	3	15	0
Architect's fee	..	..	..	54	7	5

Total £1,193 8 11

Cost of equipment :—

Commercial Room	..	..	..	£35	0	0
Manual Workshop	..	..	..	95	0	0
Domestic Science Room	..	..	..	75	0	0
Art Room	..	..	..	—

£205 0 0

FLAX EXPERIMENTS, 1912.

I.—MANURIAL EXPERIMENTS.

A.—GENERAL.

The following is a summary of the results which were obtained from the two series of experiments conducted by the Department during the eight years 1901 to 1908, inclusive * :—

- (1) The use of potassic manures, e.g., Kainit, Muriate of Potash and Sulphate of Potash, gave profitable increases; Kainit and Muriate of Potash showed almost equal merits, were more regular in their effects and, on an average, gave better results than Sulphate of Potash.
- (2) The application of Kainit and Muriate of Potash in winter gave results as good as when these manures were applied at time of sowing. The farmer can therefore suit his own convenience as to the time when he applies these manures.
- (3) Phosphatic manures, when applied either singly or in combination with a potash manure, or as part of a complete mixture, encouraged the growth of weeds at the expense of the flax, and their use was almost invariably attended with a loss, and, very frequently, even with smaller yields of scutched flax.
- (4) In some seasons profitable increases were obtained from the addition of the nitrogenous manure, Rape Meal, to Kainit. Its effects, which appeared to depend on the nature of the season, were too irregular to warrant the general adoption of such a mixture in preference to the dressings of either Kainit or Muriate of Potash, which are now so commonly used.
- (5) The application of agricultural salt was not remunerative.

Moreover, in these two series of experiments the results obtained from the addition of a nitrogenous to a potassic manure in the combinations which were employed were very irregular, and it was therefore considered advisable, in designing a third series of experiments, to arrange for testing Sulphate of Ammonia in varied quantities with Muriate of Potash, so as to gain further experience as to the influence of nitrogenous manures on flax. Still further, as the application of phosphates in the form of either Superphosphate

* For 1st Series see JOURNAL, Vol. II., pp. 636 et seq.; Vol. III., pp. 663 et seq.; Vol. IV., pp. 616 et seq.; Vol. V., pp. 449 et seq.

For 2nd Series, Vol. VII., pp. 250 et seq.; Vol. VIII., pp. 423 et seq.; Vol. IX., pp. 270 et seq.; Vol. X., pp. 279 et seq.

or Basic Slag resulted in a loss, it was also decided to test as part of a general mixture a different class of phosphatic manure, viz., Bone Flour.

In the third series of experiments which were started in 1909 at ten centres, and repeated in 1910 and 1911 in eight and nine centres, respectively, the following dressings per statute acre were tested:—

Plot 1.—Unmanured.

- „ 2.— $\frac{1}{2}$ cwt. Muriate of Potash.
 $\frac{1}{2}$ cwt. Sulphate of Ammonia.
- „ 3.—1 cwt. Muriate of Potash.
 $\frac{1}{4}$ cwt. Sulphate of Ammonia.
- „ 4.—1 cwt. Muriate of Potash.
 $\frac{1}{2}$ cwt. Sulphate of Ammonia.
- „ 5.—1 cwt. Muriate of Potash.
 $\frac{1}{4}$ cwt. Sulphate of Ammonia.
 2 cwt. Steamed Bone Flour.
- „ 6.—1 cwt. Muriate of Potash.

The returns for these years from above dressings were published in the following numbers of the Department's JOURNAL: for 1909, in Vol. XI., No. 2, page 327 *et seq.*; for 1910, in Vol. XII., No. 3, page 502 *et seq.*; and for 1911 in Vol. XIII., No. 3, page 515 *et seq.*

These experiments were again repeated in 1912, at ten centres, in the Counties of Donegal and Tyrone. The size of each plot was one-tenth statute acre and, as in previous years, all the operations connected with the experiments were supervised by officers of the Department. The scutched flax was valued at Belfast by three buyers who kindly placed their services at the disposal of the Department for this purpose.

All the plots were sown during the last fortnight in April, in very favourable weather and the seed-beds were in very good condition. Owing to an ensuing cold spell of weather with frosty nights, the brairds made slow growth at the start, but from the end of May onwards the crop made rapid progress, except at Newmills centre where, after the brairds suffered injury from an insect attack, the crop grew so irregularly as to render necessary the abandonment of the trials. Extremely wet weather prevailed during the second half of June. This caused lodging in those crops which were most advanced in growth. The first three weeks in July were fairly warm and dry, so that the portions of the crop that had been beaten down rose again. During the last week of July, throughout August, and in the first week of September there was an almost continuous and exceptionally heavy rainfall, accompanied by a very low temperature. The crop had consequently to be pulled and retted under most

unfavourable conditions. Fortunately the weather during the remainder of September was very dry. The greater part of the produce was therefore taken up from the spread-fields in good condition.

Pernau Crown seed was sown on each plot at the rate of 60 quarts per statute acre. The dates of sowing the manures and seed, and of the pulling of the flax at each centre are shown in the following statement :—

CENTRE.	Date of Sowing 1912.	Date of Pulling 1912.
Patrick Kelly, Ballyarrel, Killygordon . . .	April 18th	August 2nd
Stranorlar Co-operative Flax Society . . .	" 24th	" 1st
The Misses Knox, Killen, Fyfin . . .	" 16th	" 9th
James J. Lyons, Riversdale, Newtownstewart . . .	" 17th	" 1st
Castlefin Co-operative Flax Society . . .	" 18th	" 9th
Urney Co-operative Flax Society . . .	" 25th	" 5th
Swilly Valley Co-operative Flax Society . . .	" 19th	" 5th
William Kilpatrick, Newtowntully, Ramelton . . .	" 19th	" 6th
Alex. Watson, Galdonagh, Manorcunningham . . .	" 17th	" 5th

The following observations were made on the various plots during the growing and ripening periods :—

Plot 1. (Unmanured).—The brairds generally made a good start. There was practically no yellowing, and this remark applies equally to all the other plots. The crop made steady growth, and at pulling time it was apparently almost equal to that grown on Plot 6.

Plots 2, 3 and 4. (Muriate of Potash with Sulphate of Ammonia).—The flax on these plots was darker in colour and more vigorous in growth throughout the season than that on any of the remaining plots. This contrast was more pronounced on Plots 2 and 4 than on Plot 3, which received only half the dressing of Sulphate of Ammonia applied to the two former.

Plot 5. (Muriate of Potash, Sulphate of Ammonia and Steamed Bone Flour).—As was the case with the plots thus manured in previous years, so again in 1912, the crop on Plot 5 made relatively good progress during the first month, but subsequently got choked by a rank growth of annual weeds. At pulling time this plot was apparently much inferior to the unmanured plot.

Plot 6. (Muriate of Potash).—During the early part of the season the flax on this plot made slightly better progress than on the unmanured plot, but towards the close of the growing period it appeared in many of the centres very slightly, if anything, superior to that grown on Plot 1.

Full details of the returns from each plot at the nine centres are given in Table I. (pp. 518 and 519).

TABLE I.—Showing the Results from the Application

No. of Plot.		1	
Manure applied per Statute Acre.		No Manure.	
Name of Co-operative Society or Farmer conducting the Experiment.	Character of Soil.	Retted Straw lb.	Scutched Flax lb.
Patrick Kelly, Ballyarrel, Killygordon, Co. Donegal	Medium loam ; red till sub-soil	2,760	480
Stranorlar Co-operative Flax Society, Co. Donegal	Strong loam ; gravelly sub-soil	3,500	540
The Misses Knox, Killen, Fyfin, Co. Tyrone	Dark soil ; gravelly subsoil	3,990	490
John J. Lyons, Riversdale, Newtown-stewart, Co. Tyrone	Medium loam ; clay subsoil	3,330	520
Castlefin Co-operative Flax Society, Co. Donegal	Medium loam ; blue till sub-soil	3,260	460
Urney Co-operative Flax Society, Co. Tyrone	Medium loam ; blue till sub-soil	3,360	360
Swilly Valley Co-operative Flax Society, Co. Donegal	Heavy loam ; clay subsoil	2,660	390
Wm. Kilpatrick, Newtowntully, Ramelton, Co. Donegal	Dark loam ; clay subsoil	2,840	490
Alex. Watson, Galdonagh, Manorcunningham, Co. Donegal	Medium loam ; gravelly sub-soil	3,360	540
Average yield of Retted Straw per statute acre		3,220 lb.	
Average yield of Scutched Flax per statute acre		33 st. 12 lb.	
Percentage of Scutched Flax from Retted Straw		14.67	
Average value of Scutched Flax per stone*		8s. 2d.	
Average returns from Scutched Flax per statute acre		£13 19s. 9d.	
Average returns from Tows per statute acre		8s. 11d.	
Average returns from Flax and Tows per statute acre		£14 8s. 8d.	
Cost of Manure		—	
Estimated Profit per statute acre from use of Manures		—	

* The Flax grown on each plot at each centre was valued separately.

of Different Manures to the Flax Crop (1912).

2		3		4		5		6	
$\frac{1}{2}$ cwt. Muriate of Potash, $\frac{1}{2}$ cwt. Sulphate of Ammonia.		1 cwt. Muriate of Potash, $\frac{1}{4}$ cwt. Sulphate of Ammonia.		1 cwt. Muriate of Potash, $\frac{1}{2}$ cwt. Sulphate of Ammonia.		1 cwt. Muriate of Potash, $\frac{1}{4}$ cwt. Sulphate of Ammonia, 2 cwt. Steamed Bone Flour.		1 cwt. Muriate of Potash.	
Rotted Straw lb.	Scutched Flax lb.	Rotted Straw lb.	Scutched Flax lb.	Rotted Straw lb.	Scutched Flax lb.	Rotted Straw lb.	Scutched Flax lb.	Rotted Straw lb.	Scutched Flax lb.
3,330	600	2,980	530	3,170	550	2,800	460	2,460	420
3,360	580	3,560	590	3,640	600	3,020	440	2,800	490
4,440	590	4,200	500	4,590	610	3,690	380	4,060	530
3,710	600	3,320	550	3,840	610	3,410	540	3,130	530
3,920	570	3,900	570	3,860	600	3,580	530	3,320	590
4,020	460	3,920	400	3,870	410	3,510	310	3,960	440
3,100	470	3,080	420	3,220	450	2,660	360	3,040	450
3,290	510	3,660	570	3,640	570	3,430	490	3,250	520
3,360	510	3,720	580	3,820	630	3,550	420	3,550	450
3,614 lb. 38 st. 11 lb. 15-02 8s. 4d. £16 3s. 11d. 9s. 6d. £16 13s. 5d. 12s. 6d. £1 12s. 3d.		3,593 lb. 37 st. 5 lb. 14-55 8s. 4d. £15 13s. 4d. 9s. 8d. £16 3s. 0d. 13s. 9d. £1 0s. 7d.		3,739 lb. 39 st. 13 lb. 14-95 8s. 6d. £17 2s. 10d. 9s. 11d. £17 12s. 9d. 17s. 6d. £2 6s. 7d.		3,294 lb. 31 st. 2 lb. 13-23 7s. 11 $\frac{3}{4}$ d. £12 9s. 0d. 10s. 9d. £12 19s. 9d. £1 4s. 3d. £2 13s. 2d. (loss)		3,285 lb. 35 st. 1 lb. 14-94 8s. 2 $\frac{3}{4}$ d. £14 8s. 7d. 8s. 2d. £14 16s. 9d. 10s. 0d. 1s. 11d. (loss)	

These figures represent the average of the valuations.

EFFECT OF MURIATE OF POTASH USED ALONE.

Scutched Flax per Statute acre from unmanured plot	33 st. 12 lb.
Scutched Flax per Statute acre from Muriate of Potash (Plot 6) ..	35 st. 1 lb.
Estimated loss per Statute acre from use of 1 cwt. Muriate of Potash ..	1s. 11d.

The effect of applying 1 cwt. Muriate of Potash per statute acre was to increase the yield of straw and scutched flax at six centres, and to reduce it at the remaining three. A profitable increase of fibre was only obtained in five cases, and on the average of all centres this dressing resulted in a loss of 1s. 11d. per statute acre. This is quite an exceptional result, as almost invariably in previous years' tests a substantial profit was obtained from the use of Muriate of Potash. In this connection it must, however, be borne in mind that, contrary to usual experience, the flax on the unmanured plots in 1912 showed no signs of yellowing.

EFFECTS OF VARIOUS MIXTURES OF MURIATE OF POTASH AND SULPHATE OF AMMONIA.

Plots 2, 3 and 4 were dressed with various combinations of these manures :—

Scutched Flax per Statute acre from unmanured plot	33 st. 12 lb.
Scutched Flax per Statute acre from $\frac{1}{2}$ cwt. Muriate of Potash and $\frac{1}{2}$ cwt. Sulphate of Ammonia (Plot 2) ..	38 st. 11 lb.
Estimated profit per Statute acre from use of this mixture	£1 12s. 3d.
Scutched Flax per Statute acre from 1 cwt. Muriate of Potash and $\frac{1}{4}$ cwt. Sulphate of Ammonia (Plot 3) ..	37 st. 5 lb.
Estimated profit per Statute acre from use of this mixture	£1 0s. 7d.
Scutched Flax per Statute acre from 1 cwt. Muriate of Potash and $\frac{1}{2}$ cwt. Sulphate of Ammonia (Plot 4) ..	39 st. 13 lb.
Estimated profit per Statute acre from use of this mixture	£2 6s. 7d.

A profitable increase was obtained at eight of the nine centres from each of the mixtures applied to Plots 2 and 3, and at all the centres from the mixture applied to Plot 4. On the average, after deducting the cost of the manures, a substantial profit was left

from the use of each mixture in contrast to a small loss which ensued from the use of Muriate of Potash alone.

The four years' financial returns from the use of these mixtures as compared with that obtained from the use of Muriate of Potash are shown in the following statement:—

Manuring.	Increased Profit over Muriate of Potash alone.			Loss as compared with Muriate of Potash alone.
	1909	1910	1912	1911
	s. d.	s. d.	£ s. d.	£ s. d.
$\frac{1}{2}$ cwt. Muriate of Potash, $\frac{1}{2}$ cwt. Sulphate of Ammonia	4 0	12 2	1 14 2	1 10 1
1 cwt. Muriate of Potash, $\frac{1}{2}$ cwt. Sulphate of Ammonia	7 0	15 11	1 2 6	0 1 11
1 cwt. Muriate of Potash, $\frac{1}{2}$ cwt. Sulphate of Ammonia	8 10 (loss)	16 10	2 8 6	0 1 1

It will be seen from the above figures that widely varying results have been obtained in different seasons from the application of nitrogen in the form of Sulphate of Ammonia. A reference to the detailed returns of the various years' trials will show that these variations cannot be attributed to the respective fertility of the various soils as ordinarily understood, for quite as numerous and as large increments have been obtained from the use of Sulphate of Ammonia at centres where relatively large crops have been produced on the unmanured plots, as at those where the crops have been only medium or rather poor. In view of the striking contrast in the results obtained in the extremely warm and dry summer of 1911, and those of the abnormally wet and cold summer of 1912, it would appear more probable that the variations are largely due to the different climatic conditions of the seasons, for in the former of these two years Sulphate of Ammonia was applied at a loss, whilst in the latter it showed a substantial profit. Having regard to these variations, the cause of which as yet can only be presumed, no definite recommendation as to the use of Sulphate of Ammonia with Muriate of Potash can be made. When planning the further trials now in progress this matter was borne in mind.

EFFECT OF A MIXTURE OF MURIATE OF POTASH, SULPHATE OF AMMONIA AND STEAMED BONE FLOUR.

Scutched Flax per Statute acre from
unmanured plot 88 st. 12 lb.

Scutched Flax per Statute acre from	
1 cwt. Muriate of Potash, $\frac{1}{4}$ cwt.	
Sulphate of Ammonia, and 2 cwt.	
Steamed Bone Flour (Plot 5)	.. 31 st. 2 lb.
Estimated loss per Statute acre from use	
of this dressing	.. .. £2 13s. 2d.

The development of the flax on this plot was seriously retarded by a rank growth of weeds. A like observation was made regarding the crop on corresponding plots in previous years.

While on an average the yield of flax straw is slightly greater than on the unmanured plot, the effect of applying this mixture has been actually to reduce the yield of scutched flax at the rate of 2 stones 10 lb. per statute acre, and its value by $2\frac{1}{4}d.$ per stone, and after making allowance for the cost of the manures their use resulted on the average in a loss of £2 13s. 2d. per statute acre.

That this adverse result is due to the presence of the Steamed Bone Flour in the mixture is clearly seen by comparing the returns obtained from Plots 3 and 5.

Scutched Flax per Statute acre from	
1 cwt. Muriate of Potash and $\frac{1}{4}$ cwt.	
Sulphate of Ammonia (Plot 3)	.. 37 st. 5 lb.
Estimated profit per Statute acre from	
use of this mixture	.. .. £1 0s. 7d.
Scutched Flax per Statute acre from	
1 cwt. Muriate of Potash, $\frac{1}{4}$ cwt.	
Sulphate of Ammonia, and 2 cwt.	
Steamed Bone Flour (Plot 5)	.. 31 st. 2 lb.
Estimated loss per Statute acre from use	
of this mixture	.. .. £2 13s. 2d.

The effect of adding 2 cwt. Steamed Bone Flour to 1 cwt. Muriate of Potash and $\frac{1}{4}$ cwt. Sulphate of Ammonia has, therefore, been to reduce the yield of scutched flax by 6 st. 3 lb., and the profit by £3 13s. 9d. As adverse results have now been obtained from the use of Steamed Bone Flour in four successive years' experiments, and as like results accrued from other phosphatic manures, i.e., Superphosphate and Basic Slag, in the earlier series of experiments, it may now be definitely concluded (1) that in any of the districts where the Department's experiments have been conducted, phosphates cannot be profitably applied to flax, and (2) that this is largely, if not entirely, due to the fact that they encourage the growth of weeds to such an extent as to impair seriously the yield of the flax crop.

Pending the results of further experiments flax-growers are recommended to use :—

5 cwts. Kainit or $1\frac{1}{4}$ cwts. Muriate of Potash per statute acre.

These manures may be applied to the land at the time of sowing the flax, or, if preferred, during the previous winter.

B.—LIMING EXPERIMENTS.

Experienced flax growers have at times advocated the practice of liming land which it is intended to crop with flax in the subsequent year. An experiment designed to test the value of this practice was therefore commenced in 1911 on each of two farms in Co. Donegal. In each case there were four plots, one-quarter of a statute acre in extent. After the application of the lime in 1911 all plots were cropped with oats, and in 1912 with flax.

The treatment of the respective plots per statute acre was as follows :—

PLOT.	1911		1912	
		CROP.—OATS.		CROP.—FLAX.
1	..	No lime		No Muriate of Potash.
2	..	No lime		1 cwt. Muriate of Potash.
3	..	1 ton burnt lime		No Muriate of Potash.
4	..	1 ton burnt lime		1 cwt. Muriate of Potash.

The lime was applied to the ploughed land immediately before the seed-bed for the oats was prepared. The 1911 Oat crop on the limed plots (3 and 4) was apparently superior to that on the unlimed plots (1 and 2), but the produce was not separately threshed. The Muriate of Potash was applied at the time of sowing the flax in 1912.

Though no yellowing of the flax was observed on any plot the crop on Plot 1 (untreated) and Plot 3 (lime only) was, as compared with that on Plot 2 (Muriate of Potash only) and on Plot 4 (Lime and Muriate of Potash), somewhat uneven in growth.

Full details as to yield of flax on each plot at each centre and average returns are given in Table II. In this table the lime is reckoned at £1 per ton and the flax crop is debited with one-quarter of the cost, i.e., 5s. per statute acre. This proportion is, of course, based on the assumption that the other crops in the rotation will also benefit from the dressing of lime. Though there exist no experimental data, which might be applied to these trials, as to the effect of lime on the various crops throughout the rotation, it may be safely assumed that by charging only one-quarter of the cost to the flax crop, the proportion is, if anything, too high.

TABLE II.—Showing the Results in 1912 from the application of Lime
previous year

No. of Plot.	
Manure applied per Statute Acre.	
Name and Address of Farmer conducting the Experiment.	Character of Soil.
Robt. Roulston, Kiltown, Killygordon, Co. Donegal	Medium loam; gravelly subsoil
Thos. Elliott, Drummurphy, Castlefin, Co. Donegal	Medium loam; gravelly subsoil
Average yield of Retted Straw per statute acre Average yield of Scutched Flax per statute acre Percentage of Scutched Flax from Retted Straw Average value of Scutched Flax per stone * Average returns from Scutched Flax per statute acre Average returns from Tows per statute acre Average returns from Flax and Tows per statute acre Cost of Manure (In case of lime one fourth of the cost) Estimated profit per acre from use of Manure	

* The Flax grown on each plot at each centre was valued separately.

On referring to the returns in Table II. it will be seen that the results obtained at each of the two centres are fairly uniform; and that at both centres substantially increased yields of retted straw and scutched flax were obtained from each of the dressings.

Taking the average returns, the various dressings gave, when compared with the untreated plot, the following increased yields of scutched flax per statute acre: Muriate of Potash (Plot 2), 6 st. 6 lb.; lime (Plot 3), 4 st. 6 lb.; Muriate of Potash and lime combined (Plot 4), 10 st. When the financial results are considered, the use of lime alone on Plot 3, largely owing to the superior quality of the fibre produced, shows a clear profit of £2 2s. 1d. per statute acre as compared with the smaller profit of £1 18s. 8d. obtained

and Muriate of Potash to the Flax Crop, the Lime being applied the to Lea Oats.

1		2		3		4	
Untreated.		1 cwt. Muriate of Potash to Flax 1912.		1 ton burnt Lime to Lea Oats 1911.		1 ton burnt Lime to Lea Oats 1911, 1 cwt. Muriate of Potash to Flax 1912.	
Retted Straw lb.	Scutched Flax lb.	Retted Straw lb.	Scutched Flax lb.	Retted Straw lb.	Scutched Flax lb.	Retted Straw lb.	Scutched Flax lb.
2,624	508	3,044	588	2,880	548	3,288	632
2,824	544	3,240	644	2,912	628	3,408	700
2,724 lb. 37 st. 8 lb. 19'31 8s. 7½d. £16 3s. 2d. 5s. 7d. £16 8s. 9d. — —		3,142 lb. 44 st. 19'60 8s. 4½d. £18 6s. 9d. 5s. 3d. £18 12s. 0d. 10s. £1 13s. 3d.		2,896 lb. 42 st. 20'30 8s. 10½d. £18 11s. 7d. 4s. 3d. £18 15s. 10d. 5s. £2 2s. 1d.		3,348 lb. 47 st. 8 lb. 19'89 8s. 9d. £20 15s. 0d. 5s. 9d. £21 0s. 9d. 15s. £3 17s. 0d.	

These figures represent the average of the valuations.

from Muriate of Potash alone on Plot 2. The combination of Muriate of Potash and lime on Plot 4 gives a profit of £3 17s. p-r statute acre, which is slightly greater than the profits on Plots 2 and 3 taken together.

Apart from its value to other crops, the results of these preliminary trials indicate that the liming of land one year in advance is of considerable benefit to the flax crop. They also show that for flax, Muriate of Potash forms a valuable supplemental dressing to lime.

Before definite recommendations can be made as to the use of lime for the flax crop, it will, however, be necessary to carry out further experiments.

II.—SEED TRIALS

A.—VARIETY TESTS.

I. GENERAL.

Each year since 1901 experiments have been conducted in which seed imported by the Department directly from Holland and Russia has been tested against brands of Dutch and Russian seed imported by Ulster merchants. The results of these trials are given in the following table:—

	Russian Seed Imported by the Department.	Belfast Brand of Riga Seed.	Dutch Seed Imported by the Department.	Belfast Brand of Dutch Seed.
1901				
Yield of Scutched Flax per st. acre	45 st. 6 lb.	43 st. 4 lb.	44 st. 4 lb.	43 st. 5 lb.
Total Returns per st. acre	£18 4 11	£17 11 3	£17 5 0	£17 1 5
1902				
Yield of Scutched Flax per st. acre	39 st. 10 lb.	38 st. 3 lb.	34 st. 9 lb.	36 st. 1 lb.
Total Returns per st. acre	£15 16 1	£14 12 11	£13 12 3	£13 16 6
1903				
Yield of Scutched Flax per st. acre	Not tested	9 st. 3 lb.	14 st. 13 lb.	15 st. 8 lb.
Total Returns per st. acre		£3 17 1	£6 11 4	£6 14 1
1904				
Yield of Scutched Flax per st. acre	21 st. 12 lb.	21 st. 6 lb.	24 st. 6 lb.	23 st. 5 lb.
Total Returns per st. acre	£9 10 1	£9 8 0	£10 12 2	£10 5 10
1905				
Yield of Scutched Flax per st. acre	32 st. 4 lb.	24 st. 6 lb.	34 st. 4 lb.	34 st. 6 lb.
Total Returns per st. acre	£14 0 8	£10 1 9	£14 8 0	£14 12 0
1906				
Yield of Scutched Flax per st. acre	33 st. 8 lb.	31 st. 4 lb.	36 st. 7 lb.	37 st. 4 lb.
Total Returns per st. acre	£12 19 7	£12 4 9	£13 15 1	£14 8 7
1907				
Yield of Scutched Flax per st. acre	37 st. 12 lb.	34 st. 11 lb.	37 st. 12 lb.	33 st. 8 lb.
Total Returns per st. acre	£12 19 9	£11 18 8	£13 0 4	£11 2 6
1908				
Yield of Scutched Flax per st. acre	41 st. 8 lb.	37 st. 6 lb.	37 st. 6 lb.	35 st. 6 lb.
Total Returns per st. acre	£14 17 0	£13 9 7	£12 13 10	£12 1 11
1909				
Yield of Scutched Flax per st. acre	34 st. 8 lb.	30 st. 8 lb.	37 st. 12 lb.	32 st. 6 lb.
Total Returns per st. acre	£14 2 7	£12 12 0	£15 14 8	£13 1 1
1910				
Yield of Scutched Flax per st. acre	37 st. 11 lb.	40 st. 5 lb.	37 st. 12 lb.	33 st. 12 lb.
Total Returns per st. acre	£18 19 1	£21 3 8	£19 7 7	£17 2 11
1911				
Yield of Scutched Flax per st. acre	39 st. 5 lb.	A 35 st. 0 lb. B 36 st. 5 lb.	36 st. 11 lb.	32 st. 3 lb.
Total Returns per st. acre	£16 5 10	A £14 6 7 B £15 3 4	£15 5 2	£12 2 5
Average Returns per st. acre excluding Year 1903	£14 15 6	£13 17 6	£14 11 5	£13 11 6

The general plan of the seed trials in 1912 was similar to that carried out in previous years as shown in the foregoing Table.

The following kinds of seed were compared :—

Russian—(1) Pernau Crown, imported by the Department.
(2) Riga brand, purchased in Ulster.

Dutch— (1) Riga Child, imported by the Department.
(2) A brand purchased in Ulster.

In addition a plot was sown with Irish saved seed. Its germinating qualities, however, proved very defective, and it produced only a thin braird of weak, delicate plants. As a consequence the crop on this plot was a partial failure.

The plots, which were one-tenth of an acre in extent, were laid down at the same centres at which the manurial experiments were carried out, and were manured with Muriate of Potash at the rate of 1 cwt. per statute acre. The Russian seed was sown at the rate of 60 quarts per statute acre and the Dutch seed at 55 quarts. The supervision of the work and the valuation of the scutched flax were carried out according to the procedure detailed above in connection with the manurial experiments.

Full particulars of the returns from each variety of seed are given in Table III. (pages 528 and 529).

Very good brairds were obtained from each of the four varieties of foreign seed, and that from the locally-purchased Dutch seed was somewhat the thinnest. The Dutch Riga Child seed produced the most vigorous crop which was more uniform in length and rather later in ripening than that grown from the Dutch seed which was purchased locally.

As between the two Russian seeds it will be seen on reference to Table III. that at six of the nine centres heavier yields of straw and scutched flax were obtained from Pernau Crown than from the locally purchased seed. On the average of the nine centres the differences in yield of scutched flax, and in monetary return are, however, small, being only 1 st. 1 lb. and 4s. 7d., respectively in favour of the Pernau Crown seed.

It will be also observed that the Dutch Riga Child gave the best results of any of the seeds tested. When compared with the locally purchased brand of Dutch seed it produced on an average a higher yield of 1 st. 13 lb. of scutched flax and a larger monetary return of 17s. 1d. per statute acre.

The returns from the Irish seed were poor at each centre, and the financial returns on the whole from this seed much less than those from the imported seeds. This was possibly largely due to the impaired vitality of the seed.

TABLE III.—Showing the Returns from Trials

No. of Plot.		1	
Variety of Seed.		Pernau Crown Imported by the Department.	
Name of Co-operative Society or Farmer conducting the Experiment.	Character of Soil.	Retted Straw lb.	Scutched Flax lb.
Patrick Kelly, Ballyarrel, Killygordon, Co. Donegal	Medium loam; red till subsoil	2,460	420
Stranorlar Co-operative Flax Society, Co. Donegal	Strong loam; gravelly subsoil	2,800	490
The Misses Knox, Killen, Fyfin, Co. Tyrone	Dark soil; gravelly subsoil	4,060	530
John J. Lyons, Riversdale, Newtownstewart, Co. Tyrone	Medium loam; clay subsoil	3,130	530
Castlefin, Co-operative Flax Society, Co. Donegal	Medium loam; blue till subsoil	3,320	590
Urney Co-operative Flax Society, Co. Tyrone	Medium loam; blue till subsoil	3,960	440
Swilly Valley Co-operative Flax Society, Co. Donegal	Heavy loam; clay subsoil	3,040	450
William Kilpatrick, Newtowntully, Ramelton, Co. Donegal.	Dark loam; clay subsoil	3,250	520
Alex. Watson, Galdonagh, Manorcunningham, Co. Donegal	Medium loam; gravelly subsoil	3,550	450
Average yield of Retted Straw per statute acre . . .		3,285 lb.	
Average yield of Scutched Flax per statute acre . . .		35 st. 1 lb.	
Percentage of Scutched Flax from Retted Straw . . .		14·94	
Average value of Scutched Flax per stone* . . .		8s. 2½d.	
Average returns from Scutched Flax per statute acre . . .		£14 8s. 7d.	
Average returns from Tows per statute acre . . .		8s. 2d.	
Average returns from Flax and Tows per statute acre . . .		£14 16s. 9d.	

* The Flax grown on each plot at each centre was valued separately.

The conclusion which has been repeatedly drawn from previous trials may be once more emphasized in the light of those under review, viz., that the choice of the variety of flax seed to be sown (i.e., whether Dutch or Riga) should not be governed by the class of soil for which it is intended, but by the quality of the seed itself. For example, while in the 1910 and 1911 trials Russian seed gave the better average results on various classes of soil, the Dutch seed proved the more productive in 1909, and has again shown its

of Different Varieties of Flax Seed (1912).

2		3		4		5	
Belfast Riga Purchased in Ulster.		Irish Saved 2nd Year's Selection.		Dutch Riga Child Imported by the Department.		Belfast Dutch Purchased in Ulster.	
Retted Straw lb.	Scutched Flax lb.	Retted Straw lb.	Scutched Flax lb.	Retted Straw lb.	Scutched Flax lb.	Retted Straw lb.	Scutched Flax lb.
2,520	470	1,450	250	2,870	540	2,730	480
2,760	450	2,100	310	3,170	490	2,700	420
4,010	560	3,280	420	4,360	550	4,300	600
2,730	470	2,080	290	2,590	450	2,750	450
3,360	600	2,720	410	3,880	690	4,080	700
3,400	380	3,080	280	4,120	500	4,340	490
3,010	440	1,680	210	3,190	400	2,870	330
3,360	490	2,620	340	4,010	580	3,780	570
3,110	430	2,310	290	3,880	590	3,820	510
3,140 lb. 34 st. 15·15 8s. 4½d. £14 4s. 5d. 7s. 9d. £14 12s. 2d.		2,369 lb. 22 st. 3 lb. 13·12 7s. 11½d. £8 18s. 8d. 7s. 4d. £9 6s. 0d.		3,563 lb. 38 st. 14·93 7s. 10½d. £15 1s. 0d. 8s. 9d. £15 9s. 9d.		3,485 lb. 36 st. 1 lb. 14·49 7s. 10d. £14 3s. 6d. 9s. 2d. £14 12s. 8d.	

These figures represent the average of the valuations.

superiority in 1912. Farmers would be well advised, therefore, before purchasing their seed, to consult the leaflet on Flax Seed (No. 29), published by the Department, and revised annually, which gives information as to the harvest conditions prevailing in the two seed-producing countries (Holland and Russia) during the previous year, and affords a guide as to the quality of the seed obtainable from each.

II. SPECIAL.

In these trials the following kinds of seed were tested :—(1) and (2), two different brands of Pernau Crown ; (8) seed* from a stock carefully selected and grown on a farm in Russia for a number of years ; (4) and (5), Irish-saved seed from selected long stalks ; (6) and (7), seed from an Irish-grown crop harvested at different stages of maturity, and (8) Dutch Riga Child.

The experiments were carried out at three centres, but at one of these the crop lodged so badly that the results were unreliable, and consequently were not recorded. The size of each plot was one-eighth statute acre.

Good brairds resulted from all the varieties sown, excepting the selected Irish seeds. The latter seeds were obtained by rippling off the bolls from the two lots of dried straw during the previous winter, and when the seed was cleaned and tested its germination was found perfectly satisfactory. Though subsequently stored in a dry loft, the vitality and hence the germinating capacity of these two varieties must have been seriously impaired, for, when sown, the seeds brairded poorly and the resulting crops were thin and irregular. The crops on the other plots at each centre proved healthy and generally developed satisfactorily though it was observed that those produced by the Irish saved seed—and more especially by the immature seed—were less vigorous in growth than those from the imported seed. The Dutch Riga Child plot was in each case the most promising until shortly before pulling time, when this plot suffered most through lodging of the flax. The crop produced by the selected stock of Russian seed blossomed rather earlier than the Pernau Crown and did not develop so well as regards length of stalk in the last stages.

An officer of the Department supervised these trials throughout the various operations, and the valuation of the scutched flax was carried out according to the procedure followed with the produce of the manurial and general variety tests.

The detailed results of the trials are given in Table IV. (pp. 532 and 533).

It will be observed from this Table that the comparative returns from the various plots at the two centres are not very uniform. The Pernau Crown seeds gave, on the whole, better returns than the Russian seed of selected stock, and these three varieties better results than the Dutch Riga Child. The crops from the selected Irish seeds in both instances were much inferior to those from the imported Russian and Dutch seeds. It should, however, be borne in mind that the relatively low monetary returns from the plots

* Obtained through Dr. J. Vargas Eyre, of the Development Commission.

sown with Dutch Riga Child and selected Irish seeds were doubtless largely due to the effect of the lodging of the crop on the former and, on the latter, to the low germination of the seeds and the resulting poor brairds."

III.—THE SOWING OF RIPE AND OF LESS MATURE FLAX SEED.

This experiment was a repetition of one carried out in 1911,* with a view to obtaining information as to whether seed from a crop which was allowed to become absolutely ripe before being pulled was more suitable for sowing purposes than seed obtained from a crop when pulled solely for fibre purposes, i.e., when relatively green.

For the purpose of the experiment two lots of seed were saved from the same crop in 1911 at the two different stages of growth referred to above. For reference purposes the former seed is termed "ripe" and the latter "immature." The detailed results of the experiments are shown in Table IV. (pp. 532 and 533).

On referring to this Table it will be seen that at both centres the largest yields of retted straw and of scutched flax were obtained from the ripe seed. On an average of the returns, the ripe seed exceeded the immature, in point of yield and value of scutched flax, by 2 st. per statute acre and 1s. per stone, respectively, and in the total monetary return by £2 17s. 2d. per statute acre. The yields of scutched flax obtained from the two classes of seed show, therefore, only a slight difference, and the higher monetary return from the crop produced by the ripe seed is mainly due to the superior quality of fibre.

In the previous year's tests, the immature seed, on an average gave slightly the better results in point of yield and the fibre from the crop grown from such seed was valued at exactly the same rate as that from the produce of ripe seed. The results of the two years' experiments do not, therefore, accord, and the question in respect of which the experiments were planned and carried out is still unsolved.

B.—SELECTION OF SEED.

Large Scale Experiments.

These experiments were designed to determine the following two points:—

- (1) Can flax seed be successfully saved for sowing purposes in this country?

* JOURNAL, Vol. XIII., No. 3, pp. 529 *et seq.*

TABLE IV.—Showing the Results of Special

No. of Plot.		1		2	
Variety of Seed.		Pernau Crown A.		Pernau Crown B.	
Name and Address of Grower.	Character of Soil.	Retted Straw lb.	Scutched Flax lb.	Retted Straw lb.	Scutched Flax lb.
Edward McGettigan, Braid, Clonleigh, Strabane	Medium loam; tilly subsoil	3,248	616	3,488	648
Q. Black, Ballylin, Ramelton	Medium loam; blue clay subsoil	4,008	752	3,584	624
Average yield of Retted Straw per statute acre		3,628 lb.		3,536 lb.	
Average yield of Scutched Flax per statute acre		48 st. 12 lb.		45 st. 6 lb.	
Percentage of Scutched Flax from Retted Straw		18.85		17.98	
Average value of Scutched Flax per stone*		8s. 9d.		8s. 9d.	
Average returns from Scutched Flax per statute acre		£21 11s. 1d.		£19 16s. 10d.	
Average returns from Tows per statute acre		7s. 10d.		8s. 8d.	
Average returns from Flax and Tows per statute acre		£21 18s. 11d.		£20 5s. 6d.	

* The Flax grown on each plot at each centre was valued separately.

- (2) If so, can the flax plant be improved for fibre production by making in successive years a selection of seed from long stalks?

With these objects in view, tests in continuation of those carried out in 1911 were made in 1912, and the following classes of seed were sown in adjoining plots on several fields rented for the purpose in the Limavady district:—

- (1) Seed selected from long stalks grown from Pernau Crown in 1911.
- (2) The produce of two successive years' selection from long stalks, i.e., commencing with a crop grown from Pernau Crown seed in 1910 and continuing in 1911 with the crop grown from the seed so selected in 1910.
- (3) The produce of two successive years' selection as in (2) but from especially long stalks. This seed is referred to in this report as "Specially Selected."
- (4) Pernau Crown seed, directly imported in 1912.

Trials of Different Varieties of Russian, Dutch, and Irish Flax Seed.

3		4		5		6		7		8	
Selected Stock Russian.		Irish-Saved 1st Year's Selection.		Irish-Saved 2nd Year's Selection.		Irish-Saved Ripe.		Irish-Saved Immature.		Dutch Riga Child.	
Retted Straw lb.	Scutched Flax lb.	Retted Straw lb.	Scutched Flax lb.	Retted Straw lb.	Scutched Flax lb.	Retted Straw lb.	Scutched Flax lb.	Retted Straw lb.	Scutched Flax lb.	Retted Straw lb.	Scutched Flax lb.
3,416	648	2,744	408	2,816	424	3,536	600	3,336	560	3,696	624
3,584	616	2,952	448	3,200	512	3,448	568	3,360	552	3,512	512
3,500 lb. 45 st. 2 lb. 18 00 8s. 9d. £19 14s. 1d. 7s. 7d. £20 1s. 8d.		2,848 lb. 30 st. 8 lb. 15 02 8s. 9d. £13 8s. 6d. 6s. 1d. £13 14s. 7d.		3,008 lb. 33 st. 6 lb. 15 55 8s. 6d. £14 7s. 3d. 6s. 4d. £14 13s. 7d.		3,492 lb. 41 st. 10 lb. 16 72 8s. 10½d. £18 8s. 11d. 7s. 10d. £18 16s. 9d.		3,348 lb. 39 st. 10 lb. 16 60 7s. 10½d. £15 12s. 7d. 7s. 0d. £15 19s. 7d.		3,604 lb. 40 st. 8 lb. 15 76 7s. 7½d. £15 2s. 3d. 8s. 2d. £15 10s. 5d.	

These figures represent the average of the valuations.

The season of 1911 in which the above classes of Irish seed were saved was exceptionally dry, so that the crop of green flax from which this seed was obtained was saved in excellent condition. The flax was rippled in November of that year and the seed cleaned and stored immediately afterwards. Good germinating results were obtained from the seed early in 1912, but it apparently did not keep well in storage, for after the seed was sown the resulting braids in 1912 were thin and very delicate, and the general crop was a partial failure. It was not, therefore, possible to make reliable comparisons on a large scale between the crops grown from this seed and those from the Pernau Crown imported in 1912, which made satisfactory growth.

A portion of the 1911 crop, grown from specially selected Irish seed, was not rippled until the following spring, and the seed obtained from this flax retained its vitality and when sown produced a normal crop. A comparison was therefore made with a plot, one-eighth statute acre, of the produce of this seed with an equal and adjoining area grown from Pernau Crown. The produce of these plots was kept separate at pulling time and during the various operations which followed. The straw was scutched in the same mill, and the two lots of flax were forwarded to a firm of spinners for valuation.

They reported that the flax from the specially selected seed gave a much higher yield of dressed line than was expected, whilst that grown from Pernau Crown, in comparison, gave disappointing results.

The following is a tabulated statement of the results of this test :—

	Specially Selected Irish Seed.	Pernau Crown Seed.
Yield of dried retted Straw per st. acre	25 cwt. 1 qr. 4 lb.	26 cwt. 1 qr. 20 lb.
Yield of scutched Flax per st. acre	33 st. 2 lb.	36 st. 0 lb.
Percentage of scutched Flax from retted Straw	16.38	17.02
Value of scutched Flax per cwt. based on value of line produced	8ls. 2d.	76s.
Value of scutched Flax per st. acre	£16 16s. 3d.	£17 2s. 0d.

It will be observed that a smaller yield, both of dried retted straw and of scutched flax, was obtained from the specially selected Irish seed than from the Pernau Crown. Owing, however, to the higher value of the scutched flax from the Irish seed, the crop was worth only 5s. 9d. per statute acre less than that grown from Pernau Crown.

A general and definite conclusion cannot be drawn from the results of a trial on so small a scale. In view, however, of the fact that in a similar test, carried out in the previous year, scutched flax grown from selected Irish seed gave superior spinning results to that grown from Pernau Crown it would appear that an improved quality of flax can be obtained by means of the process of selecting seed from long stalks.

Owing to the crop in 1912 being very badly lodged it was impossible to make a selection of long stalks at pulling time, as had been done in previous years. The crop was therefore pulled in the ordinary way and dried on the field.

Instead of rippling early in the season, as was done in the previous year, the dried flax straw was stored in small lots during the winter, in lofts with open windows, so that all the bough (seed-boll) ends were left exposed to a current of air which passed through the building. When this straw was rippled in the latter end of February, 1913, an attempt to continue the selection process was made by squaring the root-ends of the handfuls and then rippling off, for sowing purposes the seed from the longest stalks only. After this seed was cleaned it was stored in small heaps on a dry, airy loft, and at sowing time in 1918 it germinated from 90 to 94 per cent.

MARKETING WILD FRUITS.

The demand for blackberries is considerable, and the export of Irish blackberries might be greatly increased, especially from the South of Ireland.

Blackberries should be pulled when they have a "blue black" bloom; red unripe berries should on no account be picked, nor should the fruit be left ungathered until it is of a "dead black" shade. Immature fruit does not ripen with storage, and spoils the flavour of the remainder. Over-ripe fruit will not bear transit by cart or train without considerable deterioration, and is generally mashed and often mouldy on delivery. Blackberries should only be picked when they are dry.

Pickers should observe cleanliness, especially as to washing their hands from time to time; clean picking pails or baskets should be used, and they should be washed and dried each day after having been emptied of the day's pickings.

Pickers should be careful not to mix leaves or stalks with the picked fruit.

In some districts it is the practice for pickers of blackberries to gather the fruit into galvanized pails and, before selling the fruit to shippers, to add water to the contents of the pails with the object of increasing the weight of fruit; this practice is not alone dishonest but seriously diminishes the value of the fruit; it is suggested that where such practices are adopted, shippers should oblige pickers to use chip baskets for collecting the fruit, thus providing one means of avoiding trickery of this sort.

Shippers should bear in mind that it is only by acting with strict honesty that they can hope to compete with home and foreign produce on the British market; if fruit is shipped in bad condition, dirty, or watered, it must result in lower prices, or possibly in a refusal to take the fruit at any price.

A considerable demand exists for blackberries in chip baskets. The chip basket of about 9 pints capacity is a very generally suitable size; it will hold six pounds of blackberries, and should be filled to rather more than that weight to allow for loss of weight in transit and ensure its containing not less than six pounds of fruit on delivery. Chip baskets of larger capacity are preferred on some markets and may be used, but the shipper must bear in mind that the greater the capacity of the basket and the longer the period of transit the firmer should the fruit be when it is picked and despatched.

Fruit thus packed in chip baskets is required for retail purposes, and it is essential that it should be in thoroughly good condition

when it reaches the market; it should, therefore, be picked before becoming fully ripe, and when in such condition that the berries if turned out on a table would roll about separately: accordingly such fruit should be carefully picked by reliable pickers into chip baskets. The bottoms of the chip baskets in which the fruit is to be sent to market should be lined with thin parchment or grease-proof paper; this precaution will protect the fruit from dirt and prevent its being squeezed through the apertures in the bottom of the basket. The fruit should be carefully examined as it is passed from the pickers' baskets to those which are to be sent to market, any leaves, stalks, over-ripe or unripe berries being rejected.

The baskets should be covered with tightly stretched butter muslin, tucked neatly and securely under the outer upper rim, or they may be covered with cardboard or chip covers securely tied on; the cardboard or chip covers are the best to use when the baskets are likely to be stacked in railway vans, as the stiff covers protect the fruit from damage. Fruit shipped in this form is usually consigned to salesmen.

Most exported Irish blackberries are forwarded to jam makers: the system of packing such fruit in large casks holding 3 cwt. and upwards, is giving way to more up to date methods: the use of large casks for blackberries is very objectionable and tends to lower the reputation and depreciate the value of Irish blackberries in British markets: the fruit is much squashed owing to the large quantity in one package, and further, if the fruit is not coming in rapidly, it may take two or more days to fill one barrel, meantime the fruit is rapidly deteriorating, and fermentation is probable: if the weather is warm, fermentation may proceed to such an extent in these large casks as to cause them to give way.

The Association of Preserve Makers in Scotland have adopted the following resolution:—

“The meeting unanimously consider it advisable that shippers of blackberries from Ireland should discontinue the packing of these berries in large casks holding 3 cwts. and upwards, in consequence of much of the fruit so packed being received by the buyers in an unsatisfactory condition, and that in all future contracts it be a condition that these berries be packed in one cwt. kiel or some other suitable small package.”

This resolution clearly indicates how important it is for Irish shippers to market blackberries in suitable small packages and in good condition.

Blackberries for jam makers should be shipped in kegs or barrels containing not more than 1 cwt. of fruit. Some of the largest buyers prefer that the packages should contain not more than 56 lb. of fruit. The barrel recommended is a re-coopered butter kiel, which will hold about 100 lb. of blackberries. The kiel should be

prepared for use as follows:—Stop all nail holes; remove the wooden hoops and substitute 6 hoops of iron, the two end hoops to be not less than 1 inch and the remainder not less than $\frac{7}{8}$ inch wide; the end hoops to be within 2 inches of the chimes; fit a handle of light wire, or hoop iron, on each side by slipping the hoop iron, or wire, under the two bulge hoops, leaving a loop handle projecting above the bulge hoop nearest the head, and turning up the ends on the lower bulge hoop. A wooden head should be fitted: the groove to take it should be deepened, and one or two vent holes, each $\frac{1}{4}$ inch to $\frac{3}{8}$ inch in diameter should be bored through the head. These holes may be plugged with cotton wool or covered with open texture sacking tacked on. The hoops when driven home should be punched into the timber here and there to keep them in position. Such a barrel is well adapted for blackberries, it can be readily cleaned, quickly filled and handled with ease; it would cost about 1s. 1d. to 1s. 8d., and is therefore cheap enough to use as a non-returnable package, or if returned and re-coopered, would possibly last for two or three journeys. This type of package has been extensively used, with satisfactory results to both shipper and buyer. It is best to leave an air space of one inch in depth between the fruit and the barrel head,

The barrel should carry a label on the head in which the ventilating holes are pierced, having on it in bold clear letters, the words

“THIS END UP.”

Other suitable packages for blackberries, are re-coopered oak butter firkins, which will hold about 70 lb. of fruit, and re-cooped ginger casks, which will hold rather more than 100 lb. of fruit: these casks should last for many years if regularly re-coopered.

In order to insure that a stock of suitable packages shall be available when the season begins, orders should be given to coopers some months in advance, but light barrels should not be stored where they would be exposed to sun and wind, otherwise they will warp and become unsuitable for use.

All casks should be very thoroughly washed out before blackberries are placed in them; if this is not done, the residue of the previous contents of the casks will most probably injuriously affect the flavour and quality of fresh fruit placed in them.

Casks which have been for some weeks in store, should be filled with clear water, some days before they will be required for use,

in order that the wood may absorb moisture and swell. If this is not done, the wood will absorb a good deal of fruit juice, there will be a considerable amount of leakage between the staves, and the hooping will be slack.

Evidence is abundant to show that all blackberries should be carefully examined by the shippers at the time of packing. All consignments received by shippers from collecting agents should be turned out of the packages in which they are received, so as to permit of proper examination. It is almost impossible for any shipper to ensure that the fruit shipped is satisfactory as to quality and condition unless this system is strictly adhered to. When the fruit is obtained through collecting agents, it will probably be found best to provide a stronger package than the re-coopered kiel for use between the collecting agent and the shipper, as such packages are often subjected to very rough treatment.

Bilberries are also called "Whorts," "Hurts," "Fraughans."

Bilberries. This fruit grows in upland, and especially in mountainous districts; it is usually to be found on hill sides above the line of cultivation. There is a very large demand for bilberries in England, especially in Lancashire and Yorkshire, where the demand usually exceeds the supply, and it is believed that the export trade in bilberries might be very largely increased, and that this fruit might be collected and shipped from many districts in Ireland, especially in the south and west where it is to be found in quantity.

The fruit grows on a low shrub, and is about the size of a small pea. When ripe the berries bear an exquisite bloom, which, however, they lose soon after picking. It is most desirable that the bloom should be retained as long as possible, and accordingly the fruit should be carefully handled. The berries should be picked when they are of a rich blue black colour, with the bloom above referred to at its best; this is usually in July and early in August. The fruit should be despatched to market as recommended for blackberries, in chip baskets of 1 gallon to 9 pints capacity, each basket packed with 6 lb. net of bilberries, and neatly covered as described above.

Wild crab apples vary considerably in size and appearance: they are usually sold mixed as to size and variety

Crab Apples. under the name of "crabs." In favourable seasons very large quantities are obtainable in the south of Ireland. The principal demand for this fruit comes from manufacturers of jelly, who require the fruit unripe. Crabs should be packed in four or five bushel sacks, filled only to such an

extent as to permit of the mouth of the sack being laced so as to provide a hand grip at each corner of the mouth. A custom prevails of filling the sacks to their utmost capacity, and lacing their mouths without providing hand-grips; this is wrong, and should not be practised, as when sacks are thus completely filled and laced, they are thrown and pitched about in handling, and the contents are bruised and thus rendered less valuable for making jelly.

Many complaints have been received by the Department, stating that sticks, stones and dirt have been mixed with crab apples shipped from Ireland. This practice should be discontinued. Shippers should satisfy themselves that apples are free from all such objectionable matter, before they are packed.

The sloe, which is the fruit of the blackthorn, is obtainable in many parts of Ireland, more especially in the south. The Irish sloe is becoming more generally known in Great Britain, and its very high quality is recognised. This fruit is ready for picking when it has a full rich bloom. On no account should unripe green sloes be picked.

The best package for transport, is a chip basket of about 2 gallons capacity. Sloes are not so perishable as blackberries and bilberries; they may, therefore, be forwarded by goods train, unless ordered otherwise by the buyer. The sloes when packed should be quite free from leaves, twigs, etc.: Irish sloes do not bear a good reputation in this respect as compared with those from the continent. There is a good market in England for sloes, provided that they can be supplied in large quantities, say not less than 5 cwt. in one consignment.

April, 1914.

Copies of this article in leaflet form (No. 93 Revised) may be obtained free of charge, and post free, on application to the Secretary, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion Street, Dublin. Letters of application so addressed need not be stamped.

CELERY LEAF-SPOT DISEASE OR BLIGHT.

This disease was first observed in Ireland in 1906, and since that time it has been spreading rapidly and causing serious losses to growers.

NATURE OF THE DISEASE.

In its early stages the disease is frequently overlooked or neglected, and it is often not until well on in the season, when its ravages may assume the nature of an epidemic, that the attention of growers becomes fully aroused to its seriousness.

It is first recognisable in the form of small discoloured areas on the foliage which may easily be overlooked unless careful examination be made. Holding a leaf up to the light and looking through it greatly facilitates the recognition of the presence of the dark, diseased spots in their early stages. As time goes on, these spots increase in number and in size; neighbouring spots join up to each other at their margins, until finally the whole leaf may become of a dirty greenish brown colour, the leaf-stalk having meanwhile also become affected. Such affected leaves then rot or wither away. The inner leaves may be found for a time free from the disease, but since it spreads rapidly (especially under warm and moist weather conditions) from the older to the younger leaves, the latter also ultimately become attacked and the whole plant is thus rendered more or less useless. (See Fig. 1.)

On the brown diseased areas of the leaves very minute, black, rounded dots can be seen with the naked eye, or, better still, with a pocket lens. (See Fig. 2.) These are the fruits of the fungus which is the cause of the disease, and each one of them is a little capsule containing myriads of spores. Each of these minute fructifications is provided, when ripe, with an apical pore through which the spores are passed to the exterior. If an affected leaf be examined, in warm damp weather, or if one be plucked and kept covered in a warm moist atmosphere, it will be seen, with the help of a pocket lens, that the spores are exuded through the pores in the form of little worm-like or tendril-shaped masses. These become broken up by rain and the spores are washed away or scattered, and thus the disease is spread.

If diseased plants are allowed to go to seed the fungus also attacks the fruit, and since commercial celery seeds each consist in reality of half a fruit it follows that the seeds become affected and carry with them the germs of the disease. (See Fig. 8.)

The recognition of the disease on the seed, however, is not an easy matter for the non-expert, since for accurate diagnosis this involves

CELERY LEAF-SPOT DISEASE OR BLIGHT.



FIG. 1.—A celery plant seriously affected with the Leaf Spot disease. The outer leaves have been completely destroyed, while the inner leaves are also attacked and are beginning to wither away.

CELERY LEAF-SPOT DISEASE OR BLIGHT.



FIG. 2.—Portion of a diseased celery leaf showing the spots produced by the fungus.



FIG. 3.—Celery seeds, the lower two being still attached to their stalks. The small black spots on the seeds are the fruiting bodies of the fungus causing the Leaf Spot disease.

the use of the compound microscope. That much of the celery seed on the market carries the disease is an undoubted fact. A recent investigation in England showed that fifty per cent. of the samples of seed examined bore the disease and a similar examination recently made in this country showed that matters are no better in this respect in Ireland.

Seedling plants of celery may show the characteristic spots of the disease on their leaves at a very early age and there can be little or no doubt that the appearance of these spots is due to the presence of the fungus on the seeds from which such seedlings are derived. It has been proved beyond question that the fruiting bodies of the fungus on the seeds can pass the winter unharmed and give rise to actively infectious spores in the spring; and the same holds good for those present on the decayed foliage.

METHODS OF CONTROL.

Fortunately there are preventive measures for this disease which, if adopted in time, will greatly minimise the losses due to it or even eliminate them altogether.

In the first place the use of infected seed must be abandoned entirely. To this end the purchaser of celery seed should insist on obtaining from his dealer a written guarantee that the seed offered for sale has been examined for the presence of the disease by a competent expert and has been found to be free from it. In order to assist dealers and others in Ireland to obtain celery seed free from disease, the Department are prepared to have samples examined and reported upon; the fee charged being one shilling per sample. Such samples should each consist of not less than a good teaspoonful of seed, and they should be forwarded, together with the necessary fees in postal order form to—

**Procuring
disease-free
seed.**

THE SECRETARY,

DEPARTMENT OF AGRICULTURE AND TECHNICAL
INSTRUCTION FOR IRELAND,

UPPER MERRION STREET, DUBLIN,

and marked in the top left hand corner, "Agricultural Branch." Letters so addressed need not be stamped. In each case the sender must also enclose with the sample a slip of paper on which is stated his full name and postal address, the name of the variety of the seed, and the source from which such seed has been, or is proposed to be, obtained.

Unless these regulations are strictly complied with no notice will be taken of samples forwarded for examination.

Official envelopes in which to forward samples may be obtained if desired free of charge and post free on application to the Secretary as above but they are not absolutely necessary.

All growers of celery should be keenly on the alert to recognise the disease, should it make its appearance, as early as possible during the season, as upon this depends to a large extent the success of spraying operations. It may be seen in seedlings in the seed bed even as early as the first week in May and possibly earlier than this. If the disease makes its appearance its

**Spraying
affected
plants.**

ravages can be checked successfully by spraying the plants with either Bordeaux or Burgundy mixture, made up in exactly the same way as is usual for spraying potatoes against the "blight" (for full details see the Department's Leaflet No. 14). Spraying should be carried out at least twice; and probably a third and perhaps a fourth application (depending upon weather conditions, etc.) will be necessary. The first application of the spray should be made when the plants are in the trenches about the second or third week in June, the second should follow about three weeks later and the third after a similar interval from the second. Before spraying it is advisable to go over the rows and remove all dead or badly affected leaves, if present, and burn them.

Satisfactory results have also been obtained by using the spraying mixtures mentioned at about half the usual strength. If this be done, the spraying must be exceptionally well carried out.

Some growers object to the appearance produced on the foliage by the use of these spraying mixtures, but if the applications be made at the proper times there should be little or no signs of them on the plants when the crop is ready for marketing.

Liver of sulphur (Potassium sulphide), at the rate of one ounce to two gallons of water, *may* be used instead of the above mixtures; this solution does not disfigure the foliage, but it is not nearly so efficient a fungicide as the mixtures containing copper; furthermore, since it is rapidly washed away by rain, the number of applications has to be greatly increased. As many as ten during the season have been found necessary in some cases.

When the plants are lifted in the autumn the outer diseased leaves, if any, must be removed and burned. On no account should they be left lying about or allowed to reach the manure or compost heap, for they will thus form a source from which the disease may make its appearance in the following season. Where the disease has appeared and spraying has been neglected the collection and destruction by burning of all affected leaves is even more imperative, and it is advisable to choose a fresh piece of land for the cultivation of celery during the following season.

Since this account of the Celery Leaf-Spot disease was written some important additional information has been obtained as a result of investigations which have been in progress for some little time in the Department's Seeds and Plant Disease Division.

It has been established definitely that the disease is transmissible through the use of affected seed, but it has also been found that if such seed be steeped, previous to sowing, for a period of three hours either in a dilute solution of formaldehyde (1 part 40 per cent. formalin in 600 parts water) or in hydrogen peroxide the fungus causing the disease is killed, the seeds are not injured, and they produce healthy seedlings.

To sum up, buy only seed that is guaranteed to be free from the disease ; watch for the first appearance of the disease and if it appears spray the plants as directed with the same mixture as is used for spraying potatoes ; remove and burn all badly infected leaves or plants ; grow celery on fresh land each season.

The ravages on the foliage produced by the maggot of the celery fly resemble somewhat in general appearance those described for the leaf-spot fungus. Where the attack is due to the fly, however, the mining maggot can be found eating out the tissues between the upper and lower skins of the leaves in the browned dead areas. The only means of checking this trouble is to perseveringly gather the affected leaves and burn them.

IDENTIFICATION OF PLANTS AND INVESTIGATION OF PLANT DISEASES.

The Department are prepared to furnish, free of charge, brief reports on the identification of plants and the investigation of plant diseases if specimens be sent for examination. The specimens should be as complete and fresh as possible and *must be carefully made up in an enclosed package, preferably a box, which should be securely fastened.*

If sent by parcel post the postage must be prepaid.

Full particulars must accompany each specimen. The specimens should be addressed to the Secretary, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion Street, Dublin, with "Agricultural Branch" marked on the outside of the cover.

Copies of this article in leaflet form (No. 5) may be obtained free of charge, and post free, on application to the Secretary, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion Street, Dublin. Letters of application so addressed need not be stamped.

IRISH EGG-LAYING COMPETITION.

SECOND QUARTERLY REPORT.

The second period of three months of the second Irish Egg Laying Competition ended on 31st March, 1914.

The following Table shows the position arranged according to value of eggs laid, of the different pens, on 31st March 1914.

Order of merit.	No. of Pen.	Breed.	No. of Eggs Laid.	Value of Eggs from 1st Oct., 1913, to 31st Mar., 1914.
				£ s. d.
1	*45	Rhode Island Red	630	3 13 3½
2	*47	Rhode Island Red	570	3 6 1½
3	*50	Rhode Island Red	554	3 4 11
4	*46	Red Sussex	572	3 4 8½
5	30	White Wyandotte	553	3 3 9
6	25	Rhode Island Red	540	3 3 9
7	1	Black Minorca	524	3 1 5½
8	31	White Wyandotte	553	3 1 5
9	2	Black Minorca	510	3 1 0
10	*44	White Leghorn	481	2 17 11½
11	*43	White Leghorn	462	2 16 11½
12	12	Buff Orpington	500	2 16 5½
13	35	White Wyandotte	494	2 16 0½
14	11	Buff Orpington	477	2 15 10½
15	28	White Wyandotte	488	2 15 5½
16	3	Black Minorca	471	2 15 5
17	27	White Wyandotte	473	2 12 3½
18	38	Rhode Island Red	445	2 10 9½
19	14	White Orpington	427	2 9 5½
20	29	White Wyandotte	430	2 9 3½
21	7	White Leghorn	424	2 8 8½
22	15	Red Sussex	425	2 8 5½
23	18	Rhode Island Red	418	2 8 3½
24	39	Rhode Island Red	426	2 7 6
25	6	White Leghorn	407	2 6 11½
26	5	White Leghorn	412	2 6 10½
27	23	Rhode Island Red	428	2 6 7
28	4	Black Minorca	394	2 6 7
29	19	Rhode Island Red	400	2 6 0
30	16	Light Sussex	380	2 5 5½
31	33	White Wyandotte	408	2 4 7½
32	40	Brown Leghorn	377	2 4 0½
33	13	White Orpington	406	2 2 4½
34	32	White Wyandotte	365	2 1 7
35	42	White Wyandotte	381	2 0 11½
36	8	White Leghorn	373	2 0 7½
37	41	Buff Orpington	344	2 0 6½
38	26	White Wyandotte	349	1 18 7½
39	21	Rhode Island Red	336	1 18 2
40	10	Brown Leghorn	362	1 17 8
41	37	White Leghorn	332	1 16 0½
42	22	Rhode Island Red	336	1 15 8½
43	17	Rhode Island Red	304	1 13 10½
44	9	Brown Leghorn	301	1 11 9½
45	24	Rhode Island Red	293	1 11 4½
46	36	White Wyandotte	253	1 4 8
47	20	Rhode Island Red	192	0 19 0½

SECOND YEAR HENS.

1	*49	Rhode Island Red	378	2 3 7½
2	*48	Rhode Island Red	371	2 2 1½

* Not competing for prizes.

It will be observed that Pen 25 (Rhode Island Red) is now bracketed with Pen 30 (White Wyandotte) for fifth place, while Pen 1 (Minorca) has been steadily gaining ground until it now occupies next place—as against eleventh place on 31st December. The eggs from this pen are of excellent size and shape.

The non-sitters are of a distinctly better utility type than those in the first competition, and promise to show up much better at the conclusion of the test.

A very gratifying feature of this report is that the average value of eggs per pullet is 2s. above the average value for the corresponding period in the 1912-13 competition. The 282 pullets under test have already laid 19,980 eggs of the actual value of £113 9s. 6½d., or an average value of 8s. per bird.

The health of the birds has been good. Two birds have died.
Health. and have been replaced since 31st December.

Broodiness. Broodiness has been less frequent than in 1912-13.

The abnormal rainfall and cold winds of February affected the egg yield to some extent. It is gratifying to note,

Weather. however, that during six weeks of continuous wet weather the litter in the houses remained dry and was freely used by the birds, all grain, as in the previous year, being fed so as to compel them to scratch for it.

Until 31st December the litter used consisted of hay mown off the pens during the previous summer, since this supply became exhausted oat straw has been used.

It is noticeable that as the competition advances the pullets become more disposed to scratch for food. In both this and the previous competition it was observed on arrival that very few of the birds seemed accustomed to grain fed in this way, and undoubtedly some that were not in good condition would have been better from the exercise of scratching for grain during the growing period.

The Special Prize of £1 for the greatest number of eggs laid between 1st October and 31st January has been
Special Prize. won by Pen 30 (White Wyandottes).

The following Table gives the figures for the four months :—

Order of merit.	Pen.	Breed.	Number of Eggs laid 1st Oct. to 31st Jan.
1	45*	Rhode Island Red . . .	367
2	46*	Red Sussex . . .	362
3	50*	Rhode Island Red . . .	331
4	47*	Rhode Island Red . . .	329
5	30	White Wyandotte . . .	320

* Not competing for prizes.

L. MURPHY.

WINTER EGG RECORDS, 1913-14.

In the issue of the JOURNAL, Vol. IX., No. 4, an article appeared dealing with Winter Egg Records and giving a number of records for the period October, 1908—March, 1909. Further articles in the JOURNAL, Vol. X., No. 3, Vol. XI., No. 3, Vol. XII., No. 3, and Vol. XIII., No. 3, set forth the results for the six monthly periods October, 1909—March, 1910, October, 1910—March, 1911, October, 1911—March, 1912, and October, 1912, to March, 1913, respectively. Some records for last winter—October, 1913—March, 1914—are given in the accompanying Tables. The results for the six winter seasons are shown in the following Table :—

Breed.	Oct., 1908 to March, 1909.	Oct., 1909 to March, 1910.	Oct., 1910 to March, 1911.	Oct., 1911 to March, 1912.	Oct., 1912 to March, 1913.	Oct., 1913 to March, 1914.
White Leghorns .	44.3	39.7	41.5	45.1	42.4	47.4
Brown Leghorns .	40.7	42.1	37.9	49.3	51.8	38.1
Black Leghorns .	—	—	—	—	64.3	—
Minorcas .	32.8	38.0	48.3	48.3	86.3	60.5
Buff Orpingtons .	54.5	42.4	45.2	42.6	49.1	58.6
White Orpingtons .	50.7	48.7	54.1	52.6	44.1	38.6
White Wyandottes .	56.6	34.2	45.2	45.8	42.9	33.9
Faverolles .	42.5	41.5	35.7	28.8	42.2	34.9
Plymouth Rocks .	35.9	39.2	45.5	36.5	43.1	38.8
Anconas .	—	—	—	64.9	—	—
Houdans .	59.2	58.5	62.5	58.0	75.8	46.4
Andalusians .	—	71.3	—	—	—	—
Rhode Island Reds .	—	—	63.9	61.9	49.1	48.4
Light Sussex .	} 31.6	32.1	39.8	41.8 }	38.4	49.7
Red Sussex .					—	32.5
Mixed Pure Breeds .	39.7	—	—	—	—	—
Mixed Breeds .	40.8	41.9	40.5	41.6	43.7	42.4
General Averages .	42.3	40.7	42.7	41.8	44.2	42.2

Omitting the breeds of which the returns relate to less than 100 birds, we have the following figures :—

White Leghorns .	47.4
White Wyandottes .	33.9
Faverolles .	34.9
Plymouth Rocks .	38.8
Rhode Island Reds .	48.4
Light Sussex .	49.7
Mixed Breeds .	42.4

It will be seen that White Leghorns, Rhode Island Reds and Light Sussex show the best results.

The great variations in results due to strain which have been continually pointed out in the articles relating to **Importance of Strain.** Egg Records, still show themselves as markedly as ever, as will be seen from the following Table :—

Breed.	Average of all the flocks.	Average of best flock.	Average of worst flock.
White Leghorns . . .	47.4	75.0	31.5
White Wyandottes, . . .	33.9	53.3	22.0
Faverolles, . . .	34.9	57.8	21.2
Plymouth Rocks, . . .	38.8	60.0	20.9
Rhode Island Reds, . . .	48.4	59.1	28.7
Light Sussex, . . .	49.7	72.7	38.3
Mixed Breeds, . . .	42.4	78.6	16.9

The importance of strain is thus again brought out.

EGG RECORDS.—WINTER, 1913-14.

SUMMARY TABLE.

Name of Breed.	October.		November.		December.		January.		February.		March.		Total of Monthly Averages.
	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	
White Leghorns, . .	180	3.4	229	1.8	261	4.7	279	7.8	327	10.2	318	19.5	47.4
Brown Leghorns, . .	20	0.9	40	0.0	37	1.6	34	5.9	34	12.2	34	17.5	38.1
Minorcas, . . .	34	10.1	59	7.6	58	7.7	88	6.1	90	10.0	89	19.0	60.5
Buff Orpingtons, . .	46	6.9	78	5.4	74	10.6	79	9.9	79	10.1	74	15.7	58.6
White Orpingtons, . .	87	1.9	101	1.8	100	2.7	98	6.4	97	10.5	89	15.3	38.6
White Wyandottes, . .	271	3.4	287	1.8	281	3.4	268	5.0	268	7.6	269	12.7	33.9
Faverolles, . . .	241	1.6	277	1.3	336	3.6	300	6.1	299	8.0	297	14.3	34.9
Plymouth Rocks, . .	426	3.5	482	2.6	486	3.4	513	5.3	504	8.9	488	15.1	38.8
Houdans, . . .	19	3.1	19	3.3	19	5.8	18	8.4	19	9.1	18	16.7	46.4
Rhode Island Reds, . .	145	5.2	134	3.4	196	4.2	231	8.1	231	10.2	208	17.3	48.4
Light Sussex, . . .	113	6.2	129	3.7	129	5.7	135	8.8	135	10.6	135	14.7	49.7
Red Sussex, . . .	7	0.0	7	0.3	7	4.7	7	10.9	7	6.9	7	9.7	32.5
Mixed Breeds, . . .	3,090	4.1	2,963	2.7	3,056	4.0	3,329	6.8	3,347	9.9	3,264	14.9	42.4
Totals, . . .	4,679	3.9	4,805	2.6	5,040	4.1	5,379	6.7	5,437	9.6	5,290	15.3	42.2

WHITE LEGHORNS.

Number.	October.		November.		December.		January.		February.		March.		Total of Monthly Averages.
	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	
1	4	4.5	4	4.2	4	1.5	4	5.0	4	5.8	4	10.5	31.5
2	29	2.5	29	0.4	29	4.5	42	9.1	39	10.9	37	18.6	46.0
3	30	4.6	55	2.7	45	6.4	45	5.5	45	6.8	45	11.4	37.4
4	18	3.1	40	0.4	48	3.2	51	6.1	51	11.6	53	24.0	48.4
5	14	1.7	14	0.0	14	4.7	14	8.0	27	8.8	26	14.9	37.8
6	33	1.6	33	1.4	33	1.8	33	8.1	35	11.2	35	22.4	46.5
7	17	6.1	16	2.8	16	1.3	16	5.2	34	7.0	34	17.9	40.3
8	5	7.2	8	8.7	16	11.4	18	14.0	26	13.7	29	20.0	75.0
9	30	3.6	30	1.9	30	4.8	30	6.0	40	11.5	30	25.1	52.9
10	—	—	—	—	26	6.7	26	11.9	26	12.0	25	22.3	—
Totals,	180	3.4	229	1.8	261	4.7	279	7.8	327	10.2	318	19.5	47.4

BROWN LEGHORNS.

1	20	0.9	40	0.0	37	1.6	34	5.9	34	12.2	34	17.5	38.1
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MINORCAS.

1	12	10.1	36	7.3	35	10.0	34	8.8	36	15.6	36	24.2	76.0
2	11	11.5	11	7.6	11	1.6	—	—	—	—	—	—	—
3	11	8.9	12	8.6	12	6.7	12	14.7	12	16.3	12	22.7	77.9
4	—	—	—	—	—	—	42	1.4	42	3.3	41	13.4	—
Totals,	34	10.1	59	7.6	58	7.7	88	6.1	90	10.0	89	19.0	60.5

BUFF ORPINGTONS.

	October.		November.		December.		January.		February.		March.		Total of Monthly Averages.
Number.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	
1	40	8.0	44	7.5	40	10.7	45	9.1	45	11.2	40	16.9	63.4
2	6	0.0	6	0.0	6	6.2	6	14.2	6	5.3	6	11.5	37.2
3	—	—	28	3.4	28	11.5	28	10.2	28	9.4	28	14.9	—
Totals,	46	6.9	78	5.4	74	10.6	79	9.9	79	10.1	74	15.7	58.6

WHITE ORPINGTONS.

1	23	3.5	34	2.7	33	3.6	33	8.7	32	11.8	24	16.8	47.1
2	36	0.9	33	0.5	33	0.4	30	1.1	30	4.8	30	14.1	21.8
3	28	1.8	34	2.2	34	4.0	35	8.9	35	14.0	35	15.3	46.2
Totals,	87	1.9	101	1.8	100	2.7	98	6.4	97	10.5	89	15.3	38.6

WHITE WYANDOTTES.

1	36	0.3	36	1.0	—	—	30	2.2	32	6.7	—	—	—
2	40	1.5	40	0.2	40	0.6	32	1.7	30	6.0	30	12.0	22.0
3	45	6.1	50	3.6	53	3.0	55	3.3	55	7.3	54	15.1	38.4
4	33	0.0	33	0.0	33	1.8	—	—	—	—	33	7.0	—
5	22	4.0	33	2.4	34	6.3	33	10.3	33	12.7	33	17.0	53.3
6	62	3.0	62	4.9	59	2.8	55	1.5	55	2.5	56	9.3	24.0
7	33	8.2	33	6.0	32	5.8	33	9.2	33	7.9	33	13.5	50.6
8	—	—	—	—	30	4.9	30	10.4	30	13.8	30	16.5	—
Totals,	271	3.4	287	1.8	281	3.4	268	5.0	268	7.6	269	12.7	33.9

FAVEROLLES.

Number.	October.		November.		December.		January.		February.		March.		Total of Monthly Averages.
	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	
1	35	1.9	35	0.0	45	0.0	—	—	—	—	—	—	27.1
2	23	0.5	23	0.0	32	0.0	32	5.1	31	7.5	30	14.0	21.2
3	20	0.0	32	2.4	30	2.0	30	3.5	32	5.8	32	7.5	22.2
4	25	0.8	22	0.0	25	0.6	25	1.6	25	2.9	24	16.3	35.6
5	20	3.0	20	2.2	20	3.0	20	4.3	20	8.0	20	15.1	37.1
6	28	1.6	27	1.9	40	3.9	40	4.7	40	10.2	40	14.8	55.6
7	30	3.7	30	4.1	30	13.4	30	8.4	30	10.6	30	15.4	34.5
8	35	1.0	60	0.6	60	3.5	70	6.3	66	8.3	66	14.8	41.7
9	20	1.6	23	0.2	40	4.7	39	10.5	41	9.0	41	15.7	57.8
10	5	0.4	5	7.8	5	14.2	5	11.2	5	9.6	5	14.6	—
11	—	—	—	—	9	3.9	9	10.0	9	6.2	9	15.0	—
Totals,	241	1.6	277	1.3	336	3.6	300	6.1	299	8.0	297	14.3	34.9

PLYMOUTH ROCKS.

1	36	0.1	33	0.9	40	2.9	40	7.1	40	6.6	40	9.9	27.5
2	8	2.9	8	0.0	11	0.0	11	9.4	11	9.5	11	11.8	33.6
3	32	8.2	36	9.6	36	6.6	36	7.1	32	7.5	32	10.0	49.0
4	25	0.0	25	5.0	26	7.6	26	10.6	27	15.0	25	21.8	60.0
5	39	6.9	39	2.2	40	1.3	40	2.6	39	7.9	39	18.9	39.8
6	21	2.1	22	0.6	22	0.9	22	4.0	22	11.5	22	18.0	37.1
7	25	7.1	29	3.9	33	3.7	33	4.1	34	6.8	34	13.0	38.6
8	35	2.2	44	1.3	45	1.4	45	3.9	45	6.5	45	14.2	29.5
9	33	0.2	33	1.2	33	2.6	33	3.5	33	4.3	33	9.1	20.9
10	20	0.5	40	0.0	30	0.0	38	4.4	40	8.5	30	16.3	29.7
11	25	10.5	31	5.3	31	8.0	31	3.8	31	11.8	31	13.5	52.9
12	30	2.9	33	2.1	30	2.5	40	5.1	30	9.1	30	13.7	35.4
13	32	1.0	30	1.2	30	4.1	29	8.9	28	12.7	24	16.1	44.0
14	48	2.4	48	1.8	48	5.0	48	7.0	62	10.7	62	21.2	48.1
15	17	7.6	31	0.3	31	1.5	41	3.0	30	7.5	30	15.4	35.3
Totals,	426	3.5	482	2.6	486	3.4	513	5.3	504	8.9	488	15.1	38.8

HOUDANS.

1	14	4.1	14	4.5	14	7.9	14	10.9	15	11.3	15	17.8	56.5
2	5	0.0	5	0.0	5	0.0	4	0.0	4	0.8	3	11.0	11.8
Totals,	19	3.1	19	3.3	19	5.8	18	8.4	19	9.1	18	16.7	46.4

RHODE ISLAND REDS.

1	32	7.3	33	3.5	33	6.2	35	7.5	34	8.9	33	19.5	52.9
2	24	5.6	26	4.4	24	7.0	24	9.0	23	15.0	—	—	—
3	40	5.9	40	5.1	40	5.8	40	8.9	42	13.0	42	20.4	59.1
4	14	4.7	12	0.4	20	0.6	21	3.1	21	6.5	21	13.4	28.7
5	19	3.0	13	0.5	19	0.7	20	4.4	20	11.5	21	14.0	34.1
6	16	1.9	10	1.2	10	5.7	10	7.5	10	6.5	10	10.3	33.1
7	—	—	—	—	25	2.8	25	10.0	25	11.5	25	18.2	—
8	—	—	—	—	25	2.9	26	4.8	26	8.5	26	17.3	—
9	—	—	—	—	—	—	30	14.9	30	9.1	30	17.0	—
Totals,	145	5.2	134	3.4	196	4.2	231	8.1	231	10.2	208	17.3	48.4

LIGHT SUSSEX.

Number.	October.		November.		December.		January.		February.		March.		Total of Monthly Averages.
	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	
1	18	9.4	28	2.4	28	5.2	30	7.7	30	10.3	30	13.8	48.8
2	14	4.5	20	1.8	20	5.0	20	5.1	20	8.5	20	13.4	38.3
3	20	5.3	20	7.1	20	7.4	20	11.1	20	12.1	20	14.2	57.2
4	36	5.3	36	3.8	36	4.5	40	6.1	40	7.2	40	11.5	38.4
5	25	6.8	25	3.7	25	7.2	25	15.6	25	17.0	25	22.4	72.7
Totals,	113	6.2	129	3.7	129	5.7	135	8.8	135	10.6	135	14.7	49.7

1	7	0.0	7	0.3	7	4.7	7	10.9	7	6.9	7	9.7	32.5
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MIXED BREEDS.

1	110	4.7	90	0.2	100	0.0	90	2.3	82	7.0	70	15.1	29.3
2	34	2.7	34	0.9	32	1.5	30	3.1	27	7.8	23	15.1	31.1
3	35	4.7	45	5.0	45	4.8	45	4.8	43	6.5	45	12.2	38.0
4	18	3.3	18	3.7	24	5.8	30	4.2	29	3.9	24	6.9	27.8
5	73	3.0	69	2.1	60	4.3	60	6.1	63	10.4	80	13.9	39.8
6	34	9.9	40	1.7	38	1.2	52	6.4	43	7.0	42	8.0	34.2
7	85	3.0	85	4.5	86	6.2	87	7.4	90	7.6	90	11.8	40.5
8	55	3.8	55	0.7	55	2.9	55	5.7	55	17.5	55	20.1	50.7
9	52	9.5	50	4.5	50	6.4	60	11.0	60	16.2	60	22.5	70.1
10	42	1.6	49	1.0	48	3.8	48	3.8	52	4.0	49	6.6	20.8
11	40	5.1	—	—	—	—	50	6.7	50	9.1	50	13.0	—
12	24	10.2	24	6.1	24	3.1	24	7.0	29	10.6	33	16.7	53.7
13	70	4.7	66	1.6	66	3.1	66	7.7	66	11.6	66	16.1	44.8
14	60	2.1	58	0.1	04	0.0	—	—	40	0.5	54	15.3	—
15	23	0.9	41	1.8	40	3.5	40	7.2	40	9.6	40	12.2	35.2
16	38	3.8	38	6.4	38	9.2	42	10.6	41	16.4	42	18.6	65.0
17	35	4.4	35	2.0	38	7.6	47	7.3	42	14.4	50	18.7	54.4
18	103	4.1	—	—	—	—	70	13.1	70	12.2	70	14.1	—
19	34	5.3	35	3.7	55	3.4	52	10.1	53	1.6	55	19.5	43.6
20	47	3.3	48	0.9	52	3.4	66	6.4	59	9.2	58	12.4	35.6
21	66	2.4	66	0.6	50	1.9	50	3.1	50	15.3	60	18.7	42.0
22	24	2.9	13	10.0	25	9.2	25	9.4	25	11.2	24	17.7	60.4
23	61	1.4	61	2.0	37	7.0	37	9.8	37	11.4	37	13.3	44.9
24	46	3.1	83	0.7	81	0.3	72	0.4	69	3.0	67	9.4	16.9
25	18	2.5	14	4.6	14	4.4	14	10.5	16	9.4	—	—	—
26	44	1.1	30	1.0	40	3.0	54	3.1	53	6.7	54	11.2	26.1
27	52	4.4	66	1.8	65	2.8	63	6.0	55	7.7	40	18.2	43.7
28	32	4.9	32	3.4	31	5.2	34	7.3	36	9.9	36	15.2	45.9
29	60	9.4	60	6.1	60	4.7	60	7.7	75	10.0	65	17.8	55.7
30	29	2.8	25	4.1	29	9.2	31	6.5	34	11.1	49	13.4	47.1
31	38	3.3	35	2.1	56	5.2	60	6.8	55	11.8	53	19.2	48.4
32	24	5.4	22	7.6	21	6.9	21	14.0	21	13.3	19	15.7	62.9

MIXED BREEDS.

Number.	October.		November.		December.		January.		February.		March.		Total of Monthly Averages.
	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	Number of Hens.	Average Number of Eggs laid per Hen.	
33	84	2.2	80	0.5	79	1.7	77	4.3	76	7.4	74	13.1	29.2
34	28	5.1	36	2.6	30	2.5	30	7.1	30	11.6	29	18.0	46.9
35	39	4.0	33	3.6	30	7.0	28	9.8	30	12.2	31	16.4	53.0
36	81	7.1	84	3.6	93	4.7	92	6.2	97	12.8	93	18.7	53.1
37	90	1.3	81	1.4	91	1.6	101	2.2	88	5.3	85	12.3	24.1
38	36	2.4	33	0.6	26	0.5	25	4.5	26	15.2	26	20.1	49.3
39	60	4.1	50	0.0	48	4.4	48	9.8	48	10.2	42	14.0	42.5
40	50	6.4	50	5.9	60	7.6	50	10.9	60	10.6	62	15.1	56.5
41	27	2.8	40	2.5	48	1.9	46	3.3	45	7.2	45	10.3	28.0
42	40	2.2	30	3.3	30	7.1	30	14.8	55	11.1	50	16.1	54.6
43	40	2.5	25	2.4	25	5.7	35	6.9	37	7.3	42	10.3	35.1
44	52	4.0	50	2.7	44	2.9	44	4.8	43	7.1	43	11.1	32.6
45	31	7.9	30	1.6	30	5.8	28	5.9	32	11.0	45	14.4	46.6
46	77	2.7	81	3.2	90	4.7	97	5.5	105	7.3	105	14.4	37.8
47	48	0.5	48	2.4	48	0.0	36	8.0	30	13.6	33	12.5	37.0
48	50	5.1	60	5.4	70	4.6	80	7.5	70	10.5	60	18.4	51.5
49	27	6.4	27	3.0	26	3.1	18	18.0	18	18.3	—	—	—
50	60	2.2	60	5.1	60	7.6	68	10.0	78	9.9	70	14.9	49.7
51	110	3.0	110	0.4	110	1.0	100	4.6	100	5.8	100	14.8	29.6
52	68	3.0	60	2.4	89	4.7	99	5.1	84	10.0	70	19.4	44.6
53	17	2.2	17	1.6	16	4.0	16	4.6	14	8.8	14	14.9	36.1
54	20	3.5	19	4.4	21	11.5	26	12.0	26	13.5	27	19.0	63.9
55	46	8.9	44	8.0	44	9.1	44	15.0	44	16.7	43	20.9	78.6
56	33	0.4	36	0.4	30	2.6	34	1.9	38	3.9	34	12.6	21.8
57	46	5.6	37	8.5	49	6.0	53	7.7	57	11.6	62	15.0	54.4
58	26	5.1	24	2.7	24	2.7	24	4.5	24	5.8	22	13.7	34.5
59	47	3.2	47	0.7	65	1.8	64	4.2	60	6.8	59	10.2	26.9
60	70	11.9	80	5.1	80	8.6	80	13.7	86	17.0	86	12.3	68.6
61	50	0.0	50	1.6	50	2.5	50	7.4	50	11.1	50	12.1	34.7
62	20	9.1	20	1.2	20	2.2	20	7.7	19	9.9	18	17.2	37.3
63	30	3.6	30	2.1	46	3.7	46	7.0	47	12.2	58	16.7	45.3
64	23	2.7	22	2.7	22	7.0	20	8.8	20	11.7	20	14.9	47.8
65	—	—	5	16.6	14	14.3	18	13.3	7	11.6	7	15.1	—
66	22	1.4	22	1.3	28	2.2	28	2.6	—	—	—	—	—
67	36	4.5	35	1.4	36	0.5	38	1.6	33	4.4	—	—	—
68	—	—	—	—	—	—	72	6.4	71	9.2	70	19.7	—
69	—	—	—	—	—	—	29	14.0	29	14.7	29	16.6	—
Totals,	3,090	4.1	2,963	2.7	3,056	4.0	3,329	6.8	3,347	9.9	3,264	14.9	42.4

OFFICIAL DOCUMENTS.

I.—AGRICULTURE.

Form A. 134 (a).
1914.

DEPARTMENT OF AGRICULTURE AND TECHNICAL INSTRUCTION FOR IRELAND.

AGRICULTURAL STATION, BALLYHAISE, CO. CAVAN.

SESSION 1914-15.

CREAMERY COURSE.

[Subject to revision.]

Provision has been made at the Agricultural Station, Ballyhaise, for a course of technical instruction for young men who intend to become Creamery Managers.

The course to be held in the year 1914-15 will commence on Tuesday, 13th October, 1914, and will terminate on Friday, 12th March, 1915. There will be an interval of about a fortnight at Christmas.

The following subjects will be included in the course :—Physical Science in relation to Creamery work ; Dairy Bacteriology ; Dairy Technology ; Dairy Engineering ; Business Methods.

The course will be particularly suitable for those who have had experience of creamery work.

Students who intend to compete for certificates under the Department's scheme for improvement in the management of creameries will have special facilities for the study of the subjects prescribed for the examination in connection with these certificates which is to be held in March, 1915.

At the close of the technical course at Ballyhaise Agricultural Station, a limited number of the best students will be afforded facilities for learning the practice of Creamery Management during the summer of 1915, in selected creameries in Ireland. Such students will receive a maintenance allowance at the rate of ten shillings per week, in addition to free instruction, while in attendance at the creamery.

Applicants for admission to the course must be at least eighteen years of age on the 1st October, 1914.

Admission is conditional on passing the entrance examination, producing certificates of good health and character, and paying the specified fee.

Applicants who fulfil the foregoing conditions are admitted in the order in which their applications, on Form A. 134, are received in the Department's offices, preference being given, however, to those who have experience of creamery work, extending over at least one season in a creamery.

Students are required to take part, as directed by the Principal, in all branches of the outdoor work of the Station which relate to dairying. They must conform strictly to the disciplinary rules in force at the Station.

ENTRANCE EXAMINATION.

The Entrance Examination for the 1914-15 course will be held in August, 1914. Each applicant will receive about ten days' notice of the arrangements for this Examination.

The following subjects are included in the examination :—

Arithmetic.—Calculations requiring a knowledge of weights and measures, decimal and vulgar fractions, areas, volumes and percentages.

English.—Dictation, Grammar and Composition.

No applicant will be admitted who fails to satisfy the Department that his education and experience are such as to enable him to follow the course satisfactorily.

No expenses will be allowed to candidates in connection with their attendance at this examination.

FEE.

The fee for tuition, board, residence, laundry and ordinary medical attendance during the course will be £10.

The fee must be paid to the Principal of the Station on entrance, and, in addition, a sum of £1 must be deposited at the same time to cover the cost of repairs to clothes, the purchase of books, stationery, &c. The unexpended balance, if any, of this deposit will be refunded at the close of the course.

FREE PLACES.

Free places at the course will be offered to a limited number of *bona fide* managers of creameries or auxiliary creameries of at least three years' standing.

An applicant to whom a free place is granted will be required, like other students, to lodge with the Principal on entrance the fee of £10 and the deposit of £1 above mentioned, but in his case the amount of the fee will be refunded to him at the conclusion of the course. The Department, however, reserve the right to retain the fee if the applicant fails to take full advantage of the course.

OUTFIT.

Students will be required to provide themselves with a proper outfit, particulars of which will be supplied to the successful candidates.

APPLICATIONS FOR ADMISSION.

Application for admission must be made on the prescribed form to be obtained from—

THE DEPARTMENT OF AGRICULTURE AND
TECHNICAL INSTRUCTION FOR IRELAND,
UPPER MERRION STREET, DUBLIN.

Separate forms of application are prescribed for free place and for paying students.

Applications should be forwarded as soon as possible. The latest date for making application will be 1st August, 1914.

NOTE.—INSTRUCTION IN CHEESEMAKING.

Students who have taken out the 1914-15 Creamery Course to the satisfaction of the Department and who desire instruction in cheesemaking will receive preference when apprenticeships at the Cheesemaking Course, to be held at Ballyhaise Agricultural Station from May to October, 1915, are being awarded. The fee for the Cheesemaking Course will be £5.

Department of Agriculture and Technical
Instruction for Ireland.

AGRICULTURAL EDUCATION FOR YOUNG MEN.
Session 1914-1915.

FARM APPRENTICESHIPS.

AGRICULTURAL STATION, ATHENRY, CO. GALWAY.

Young men who intend to become farmers in Ireland are admitted to the Station for one year, as apprentices, for a course of practical training in several branches of farming. Instruction in the principles of the sciences underlying ordinary farm practice is also provided.

Apprentices are admitted without payment of any fee. They are required to take part in all the operations of the fields and of the farm yard. They must perform diligently all work assigned to them by the Farm Manager or his foreman. Applicants are not admitted unless they are regarded as generally fitted to discharge the duties of an apprentice.

Technical instruction in the class-room is included in the course. During the spring and summer months such instruction is given only at times when the weather is unsuitable for outdoor work. The class-room instruction is of such a character as to continue the general education of the apprentices and be useful to them in their future career as farmers. It is not intended as a preparation for any examination.

Applicants for apprenticeships must be not less than seventeen years of age on the date of admission. Preference is given to those applicants who produce evidence that they have sure prospects of obtaining farms of their own, or *bona fide* occupation at farming. If, in addition, such applicants have attended a course of instruction under the Department's Scheme of Winter Agricultural Classes, they are allowed priority in order of admission to the Station. It is also a recommendation if the applicant has attended a course of instruction held under the Department's Scheme of Winter Agricultural Classes, or if he produces a certificate from an Itinerant Instructor in Agricul-

ture that he has taken advantage of the Instructor's lectures and demonstrations and has shown a desire to improve his knowledge of tillage farming.

The apprentices are required to reside in the buildings attached to the Agricultural Station, where they are under the immediate supervision of the Superintendent.

Admission as an apprentice is conditional on producing certificates of good health and character.

The course of study will extend from the 15th October, 1914, to the 12th October, 1915. There will be an interval of about a week at Christmas during which the apprentices may return to their homes.

Applications for apprenticeships may be made at any period of the year. Subject to passing a qualifying examination to test their fitness from an educational point of view to take advantage of the course at the Station, and satisfying the Department that they are physically equal to the farm work of the Station, apprentices are admitted in the order of the receipt of their applications in the Department's offices. The Department do not guarantee admission to any applicant. An apprentice is not retained at the Station if he is found unable to perform a fair day's work or to be otherwise unsuitable.

Outfit.

Apprentices are required to provide themselves with a proper outfit, particulars of which are supplied to applicants when they are being notified of their admission.

A sum of £1 must be deposited with the Superintendent on entrance to cover the cost of repairs to clothes, the purchase of books, stationery, etc. The unexpended balance, if any, of this deposit is refunded on the termination of the apprenticeship.

Applications for Admission.

Application for admission must be made on the prescribed form, to be obtained from—

THE DEPARTMENT OF AGRICULTURE AND
TECHNICAL INSTRUCTION FOR IRELAND,
UPPER MERRION STREET,
DUBLIN.

**DEPARTMENT OF AGRICULTURE AND TECHNICAL
INSTRUCTION FOR IRELAND.**

AGRICULTURAL EDUCATION FOR YOUNG MEN.
Session 1914-15.

FARM APPRENTICESHIPS.

**AGRICULTURAL SCHOOL, CLONAKILTY, COUNTY
CORK.**

Young men who intend to follow the farming profession in Ireland, and who desire to acquire a practical knowledge of its several branches, are admitted to the School as apprentices.

The farm is managed by an experienced agriculturist, under whose direction the apprentices are required to take part in all the work of the fields and of the farmyard, whether in connection with seasonable operations or permanent improvements. In the class-room attention is given, in the evenings and at other times when outdoor work is not pressing, to English, Arithmetic (including Surveying), Book-keeping and Technical Agriculture. This instruction is not intended as a preparation for any examination. It is of such a character as to continue the general education of the apprentices, and be useful to them in their future career as farmers.

Applicants for apprenticeships must be not less than seventeen years of age on the 1st October, 1914. Preference is given to those applicants who produce evidence that they have sure prospects of obtaining farms of their own, or *bona fide* occupation at farming. If, in addition, such applicants have attended a course of instruction under the Department's Scheme of Winter Agricultural Classes they are allowed priority in order of admission to the School. It is also a recommendation if the applicant produces a certificate from the Itinerant Instructor in Agriculture for the County in which he resides that he has taken advantage of the Instructor's lectures and demonstrations and has shown a desire to improve his knowledge of tillage farming.

The apprentices are required to reside in the buildings attached to the School, where they are in the charge of a house master and matron.

The 1914-15 Session will commence on the 13th October, 1914, and will terminate on the 13th August, 1915. There will be two intervals, each of about a fortnight, during which the apprentices may return to their homes—one at Christmas and the other at Easter.

Admission as an apprentice is conditional on passing the entrance examination, producing certificates of good health and character and paying the required fee according to the scale indicated overleaf.

Applicants who have been pupils at Winter Agricultural Classes are exempted from the entrance examination, provided their attendance and progress at the Agricultural Classes have been satisfactory.

An apprentice is not retained at the School if he is found to be unable to perform a fair day's work, or to be otherwise unsuitable.

ENTRANCE EXAMINATION.

The entrance examination in connection with the 1914-15 Session will be held in September, 1914. About ten days' notice of the arrangements for this examination will be given to each applicant.

The following subjects are included in the examination :—

Arithmetic—Simple calculations requiring a knowledge of weights and measures.

English—Dictation, Grammar and Composition.

The examination will be of such a nature as should present little difficulty to a young man who has passed the fifth standard at a National school.

No candidate is admitted whose general education is insufficient to enable him to profit by the class-room instruction, or who is, in the opinion of the Department, unsuitable in any other respect for an apprenticeship.

No expenses are allowed to candidates in connection with their attendance at the entrance examination.

FEES.

1. For apprentices whose parents or guardians derive their means of living mainly from farming in Ireland the inclusive fees for tuition, board, residence and ordinary medical attendance are proportional to the aggregate tenement valuation of their holdings, as follows :—

	<i>Per Session.</i>
Where the aggregate valuation does not exceed £20,	£3
Exceeds £20 but does not exceed £40,	£6
Exceeds £40 but does not exceed £100,	£10
Exceeds £100,	£15

2. For apprentices not included in the foregoing classes, £20

Apprentices are notified of the fees payable by them. Fees must be paid to the Principal on entrance, and in addition a sum of £1 must be deposited at the same time to cover the cost of repairs to clothes, the purchase of books, stationery, &c. The unexpended balance, if any, of this deposit is refunded at the close of the session.

FREE PLACES.

The Committees of Agriculture for Counties Cork, Kerry, Kildare, Kilkenny, King's, Limerick, Queen's, Roscommon, Tipperary (N.R.), Tipperary (S.R.), Waterford, Westmeath and Wexford, have made provision for scholarships tenable at an agricultural school during the 1914-15 Session. These scholarships will be offered for competition amongst the best students attending the Winter Agricultural Classes during the 1913-14 Session. Each successful competitor will be given the option of taking out his scholarship at either Ballyhaise or Clonakilty Agricultural School.

OUTFIT.

Apprentices are required to provide themselves with a proper outfit, particulars of which are supplied to the successful candidates.

APPLICATIONS FOR ADMISSION.

Application for admission must be made on the prescribed form, to be obtained from—

THE DEPARTMENT OF AGRICULTURE AND
TECHNICAL INSTRUCTION FOR IRELAND,
UPPER MERRION STREET, DUBLIN.

The applications will be dealt with in the order of their receipt in the Department's Offices. They should be forwarded not later than 11th August, 1914.

DEPARTMENT OF AGRICULTURE AND TECHNICAL
INSTRUCTION FOR IRELAND.

INSTRUCTION IN FRUIT-GROWING AND GENERAL
GARDENING.

HORTICULTURAL SCHOOL,
ALBERT AGRICULTURAL COLLEGE, GLASNEVIN,
DUBLIN.

SESSION, 1914-15.

The course provided at this School is suited for men who have already had experience in fruit-growing and general gardening, such as can be obtained by working for four or five years under a fully qualified gardener. In addition to the practical work in the gardens, class-room instruction is given to the students to enable them to understand the scientific principles underlying horticulture.

Applicants for admission to the 1914-15 session must be not less than twenty years of age, or more than thirty years on the 1st October, 1914, in good health, and of strong constitution. They should have received a fair general education, and will be required to produce evidence that they have been employed regularly at garden work. They must have been born in Ireland or have been resident in Ireland for at least three years prior to 1st October, 1914.

Students will be admitted on probation as the result of an examination which will be held in Dublin on the 7th August, 1914. The subjects included in the examination will be :—

- (1.) English—to be tested by dictation and a short letter.
- (2.) Arithmetic—the first four rules, simple and compound ;
a knowledge of weights and measures; and percentages.
- (3.) Practical Fruit-growing and Gardening.

A high standard will not be expected in English or Arithmetic. The examination in practical fruit-growing and gardening will cover the whole range of these subjects.

No expenses will be allowed to candidates in connection with their attendance at this examination.

Successful candidates will be required to enter on their duties on the 13th October, 1914.

The session will close on the 30th September, 1915. Students may be retained at the School beyond that date, if, in the opinion of the Department, they would profit by an extension of the course.

Students are provided with furnished lodging, including coal and light, and receive an allowance of 14s. per week. They are required to find their own board.

Students of the Horticultural School are subject to such regulations regarding conditions of work, hours of attendance, etc., as may be made from time to time by the Department.

The Department do not undertake to employ or to procure employment for students at the close of the courses, but the names of those who qualify are sent to County Committees of Agriculture with an intimation that they are eligible for appointment by such Committees to instructorships under the Department's Scheme of Instruction in Horticulture and Bee-Keeping.

Several men who have passed through the School are now employed by County Committees of Agriculture.

Application to attend the examination must be made on the prescribed form, to be obtained from

THE DEPARTMENT OF AGRICULTURE AND
TECHNICAL INSTRUCTION FOR IRELAND,
UPPER MERRION STREET, DUBLIN.

Last date for making application—11th July, 1914.

A 470 (a)
1914. F.

DEPARTMENT OF AGRICULTURE AND TECHNICAL
INSTRUCTION FOR IRELAND.

**NORTH-WEST AGRICULTURAL SCHOOL,
STRABANE.**

INSTRUCTION FOR YOUNG WOMEN.

Courses of Instruction in Poultry-keeping, Buttermaking and Domestic Economy are provided at this School.

The first course of instruction in these subjects will open on the 24th March, 1914, and will be of six weeks' duration.

The course will be open to resident pupils only. Accommodation for twenty-four pupils is provided.

Applicants for admission must be not less than seventeen, or more than thirty-five years of age on the opening date of the course. Those applicants who have satisfactorily attended classes or lectures under the Department's Schemes of Instruction in Poultry-keeping or Butter-making, will receive a preference in regard to admission. Applicants must satisfy the Department that they have received sufficient general education to enable them to take advantage of the instruction provided.

Instruction will be given in Poultry-keeping, Cookery, Sewing, and Housewifery. Lectures on Sick Nursing will also be given.

Eight scholarships, entitling the holders to free instruction, board and residence during the course, are being provided by each of the County Committees of Agriculture of Donegal, Londonderry, and Tyrone, for applicants resident in their respective counties.

Applications for these scholarships should be addressed to the Secretaries of the County Committees named. Their addresses are as follows :—

	The Secretary, Co. Donegal Committee of Agriculture, Courthouse, Lifford ;
„	Co. Londonderry Committee of Agriculture, Courthouse, Coleraine ;
„	Co. Tyrone Committee of Agriculture, Courthouse, Omagh.

The Scholarships will be awarded to eligible applicants subject to the approval of the Department, in the order in which their applications for admission have been received.

Eligible applicants for whom no Scholarships are available, may be admitted on payment of a fee of £2. Such applicants, if resident in County Donegal, Londonderry, or Tyrone, may, if they prefer, have their names retained on the list for consideration in connection with the award of scholarships for the next similar course.

A sum of £1 must be deposited by each pupil on entrance to cover the cost of purchase of books, stationery, etc. The unexpended balance, if any, of this deposit, will be refunded at the close of the course.

Each pupil must provide herself with a proper outfit, particulars of which will be forwarded to her with the notification of her admission.

Suitable facilities for fulfilling their religious duties are provided for all pupils, and they are under the supervision of an experienced matron.

Forms of application may be obtained from the Secretaries of the County Committees of Agriculture mentioned above, or from the Secretary, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion Street, Dublin.

Applications for admission should be made on the prescribed form not later than the 10th March, 1914, and all applicants resident in any of the counties of Donegal, Londonderry, and Tyrone, should forward their applications to the Secretary of the County Committee of Agriculture of the county in which they reside (see other side for addresses).

February, 1914.

FORM A. 168 (a.)

1914.

DEPARTMENT OF AGRICULTURE AND TECHNICAL INSTRUCTION FOR IRELAND.

POULTRY FATTENING.

Apprenticeships.

The Department have made arrangements with the owner of an approved poultry fattening station in Co. Wicklow for the training, as apprentices, of a limited number of young men who desire to become qualified for the position of poultry fattener at a fattening station in Ireland. Apprenticeship may extend over a period of twelve months or longer according to the efficiency of the apprentice.

The apprentices will be instructed in the preparation of suitable foods, the selection and buying, fattening, cramming, killing, plucking and preparation of poultry for market. They will be required to devote their whole time to such work. Apprentices who make satisfactory progress will be provided with instruction in the incubation, rearing and management of poultry.

Applicants for apprenticeships must be at least nineteen years of age, unmarried, in good health and of strong constitution. Preference will be given to those who have had experience in poultry-keeping.

The apprenticeships will be awarded on the result of an examination which will be held in Dublin on Friday, 27th March, 1914. The examination will include written tests in English and Arithmetic. A high standard will not be expected in these subjects. Each candidate will also be examined orally as to his general suitability for an apprenticeship.

No expenses will be allowed to candidates in connection with their attendance at this examination.

Successful candidates will be called up for training as vacancies may occur. They will receive wages at the rate of 16s. per week from the date of their commencing work and will be required to find their own board and lodging. The apprenticeship may be determined at any time by one week's notice on either side.

The Department do not undertake to employ or to procure employment for apprentices on the conclusion of their training.

Applications should be made on forms provided for the purpose, which can be obtained from

The Secretary,
Department of Agriculture and
Technical Instruction,
Upper Merrion Street, Dublin.

**Latest date for receiving applications, 23rd March;
1914.**

Form A. 181 (a)
1914.

DEPARTMENT OF AGRICULTURE AND TECHNICAL INSTRUCTION FOR IRELAND.

FORESTRY INSTRUCTION.

A limited number of apprenticeships in Forestry will be awarded on the result of an examination which will be held in Dublin on the 3rd September, 1914.

Applicants for apprenticeships must be not less than eighteen years of age and not more than twenty-five years on the 1st October, 1914. They should be in good health, and of strong constitution, and have received a fair general education. Preference will be given to those applicants who have had experience of work in woods.

The subjects included in the examination will be—

English—to be tested by dictation and a short letter.

Arithmetic—the first four rules, simple and compound; a knowledge of weights and measures, proportion, percentages, and of the elements of the mensuration of lengths, areas and volumes.

No expenses will be allowed to candidates in connection with their attendance at this examination.

The successful candidates will be required to work under the directions of a skilled foreman, for at least one year, in one of the woods belonging to the Department. During this period apprentices will be given facilities for improving their general education. Apprentices who acquit themselves in such a manner as to lead the Department to believe that they are likely to make suitable foresters may, at the end of this period, be selected to attend a further course of instruction at Avondale Forestry Station, Rathdrum. The duration of the course at Avondale may extend from one to two years, and in addition to class-room instruction apprentices will be required to take part in the work of the woods attached to the Station or in such other woods belonging to the Department as may be decided on from time to time.

Apprentices will be required to enter on their duties on the 1st October, 1914.

Each apprentice will receive during the first year an allowance at the rate of 14s. per week, with furnished lodging. When in receipt of this allowance the apprentices will be required to find their own board. Such apprentices as are selected to attend at Avondale Station for a further period of training will be provided with free board, lodging and education and receive allowances at the rate of 5s. per week.

Apprentices must undertake to conform with the rules and regulations made from time to time in connection with their work in the Department's woods and at the Forestry Station.

The engagement between apprentices and the Department may be determined at any time by one week's notice on either side.

The Department do not undertake to employ or to procure employment for apprentices on completion of their training.

Applications for apprenticeships must be made on the prescribed forms to be obtained from—

THE DEPARTMENT OF AGRICULTURE

AND TECHNICAL INSTRUCTION,

UPPER MERRION STREET,

DUBLIN.

Last date for making application—21st August, 1914.

**DEPARTMENT OF AGRICULTURE AND TECHNICAL
INSTRUCTION FOR IRELAND.**

**LOANS FOR THE REPAIR AND EQUIPMENT
OF SCUTCH MILLS, MEAL MILLS, KILNS
FOR DRYING, &c.**

The Department are prepared to consider a limited number of applications for loans to aid in the repair and equipment of existing mills, etc., or the adaptation of existing buildings to be used as such, subject to the following conditions :—

1. Application should be made on the prescribed form, which may be obtained, free of charge, from the Department.

2. Unless in exceptional circumstances, the amount to be advanced by the Department will not exceed two-thirds of the approved cost.

3. The applicant shall furnish the Department with a statement setting forth the special object in view, in providing the mill, etc., together with information as to site, particulars of tenure, and such other details as the Department may require.

4. The applicant may not take any steps, except at his own risk, to begin the work of repairing, equipping or erecting the building, or incur any liability until the Department have signified in writing their approval of the plans, estimate of cost of repair or of additional buildings, machinery, equipment, etc.

The issue of this approval shall not, however, bind the Department to grant a loan unless the conditions of this scheme shall have been complied with to the satisfaction of the Department.

5. The sum advanced shall be expended in a manner approved by the Department.

6. The applicant shall, together with two or more solvent sureties approved by the Department, enter into a bond to repay the loan in not more than ten equal annual instalments, payable on the 1st day of April in each year, with interest at the rate of 3 per cent., the first instalment, with interest calculated from the date of advance, to be repayable, as the Department may determine, either on the gale day or on the second gale day following the date of said advance. Provided, however, that the borrower shall be at liberty to repay at any earlier date the full amount of the balance of the loan, together with the interest to such date.

In addition, should the Department so require, the sum advanced shall be duly charged as a first charge on the buildings, machinery, and equipment.

7. During the period the loan is outstanding, the buildings, machinery and equipment shall be kept in proper repair, and (if the Department so require) adequately insured, by the applicant at his own expense. The receipts for insurance premiums shall be submitted to the Department each year for inspection.

8. The Department shall have the right at all reasonable times to inspect the buildings, books, machinery and equipment.

9. The applicant shall undertake to furnish such reports and to keep such accounts in connection with the working of the mill as the Department may require, and shall submit same to the Department when requested to do so.

10. In all matters relating to loans under this scheme, and to the regulations of the scheme, the decision of the Department shall be in every respect final and conclusive.

DEPARTMENT OF AGRICULTURE AND TECHNICAL INSTRUCTION FOR IRELAND.

NEW SCHEME OF FIELD MANURIAL EXPERIMENTS.

Experiments I. to V. inclusive are to be conducted on peat soils only. In each case a sample of the soil is to be taken before the plots are laid down and submitted for analysis to permit of the percentage of lime and organic matter being determined.

Experiment VI. is to be carried out in all seaboard counties where seaweed is generally used. In order that tests of this kind may provide information as precise and comprehensive as possible, Instructors are required to submit to the Department small but representative samples of the seaweed applied. The samples should reach the Department in such condition as will render it possible to identify the species of the seaweed.

I.—OATS.

Size of Plot : One-tenth Statute Acre.

The following kinds and quantities of manures will be used per statute acre :—

No. of Plot.

1	No Manure.
2	3 cwt. Superphosphate.
3	{ 3 cwt. Superphosphate. 2 cwt. Kainit.
4	{ 1 cwt. Sulphate of Ammonia. 3 cwt. Superphosphate. 2 cwt. Kainit.
5	{ 1 cwt. Nitrate of Soda. 3 cwt. Superphosphate. 2 cwt. Kainit.

II.—TURNIPS.

Size of Plot : One-twentieth Statute Acre.

The following kinds and quantities of manures will be used per statute acre :—

No. of Plot

1	15 tons Farmyard Manure.
2	{ 15 tons Farmyard Manure. 4 cwt. Superphosphate.
3	{ 15 tons Farmyard Manure. 4 cwt. Slag.
4	{ 15 tons Farmyard Manure. 4 cwt. Superphosphate. 2 cwt. Kainit.
5	{ 15 tons Farmyard Manure. 4 cwt. Slag. 2 cwt. Kainit.

No. of Plot.

6	{	4 cwt. Superphosphate.
		1 cwt. Sulphate of Ammonia.
		3 cwt. Kainit.
7	{	4 cwt. Slag.
		1 cwt. Sulphate of Ammonia.
		3 cwt. Kainit.

III.—MANGELS.

Size of Plot : One-twentieth Statute Acre.

The following kinds and quantities of manures will be used per statute acre :—

No. of Plot.

1		20 tons Farmyard Manure.
2	{	20 tons Farmyard Manure.
		4 cwt. Superphosphate.
		4 cwt. Kainit.
3	{	20 tons Farmyard Manure.
		4 cwt. Superphosphate.
		1 cwt. Sulphate of Ammonia.
		4 cwt. Kainit.
4	{	20 tons Farmyard Manure.
		4 cwt. Superphosphate.
		2 cwt. Sulphate of Ammonia.
		4 cwt. Kainit.
5	{	4 cwt. Superphosphate.
		2 cwt. Nitrate of Soda.
		4 cwt. Kainit.
6	{	20 tons Farmyard Manure.
		4 cwt. Superphosphate.
		2 cwt. Sulphate of Ammonia.
		4 cwt. Salt.
7	{	4 cwt. Superphosphate.
		2 cwt. Nitrate of Soda.
		4 cwt. Salt.

All manures to be applied before seed is sown.

IV.—POTATOES.

Size of Plot : One-twentieth Statute Acre.

The following kinds and quantities of manures will be used per statute acre :—

No. of Plot.

1		15 tons Farmyard Manure.
2	{	15 tons Farmyard Manure.
		1 cwt. Sulphate of Ammonia.
		4 cwt. Superphosphate.
		1 cwt. Muriate of Potash.

No. of Plot.

8	{	15 tons Farmyard Manure. ½ cwt. Sulphate of Ammonia. 4 cwt. Superphosphate. 1 cwt. Muriate of Potash.
4	{	15 tons Farmyard Manure. 4 cwt. Superphosphate. 1 cwt. Muriate of Potash.
5	{	1½ cwt. Sulphate of Ammonia. 6 cwt. Basic Slag. 1½ cwt. Muriate of Potash.
6	{	1½ cwt. Nitrate of Soda. 6 cwt. Basic Slag. 1½ cwt. Muriate of Potash.
7	{	1½ cwt. Nitrate of Soda. 6 cwt. Superphosphate 1½ cwt. Muriate of Potash.
8	{	1½ cwt. Sulphate of Ammonia. 6 cwt. Superphosphate. 1½ cwt. Muriate of Potash.

V.—MEADOW HAY EXPERIMENT.

Size of Plot : One-twentieth Statute Acre.

The following kinds and quantities of manures will be used per statute acre :—

No. of Plot.

1	No Manure.
2	{ 2 cwt. Basic Slag. 2 cwt. Kainit.
3	{ ½ cwt. Nitrate of Soda. 2 cwt. Basic Slag. 2 cwt. Kainit.
4	{ 1 cwt. Nitrate of Soda. 2 cwt. Basic Slag. 2 cwt. Kainit.
5	{ 1 cwt. Nitrate of Soda. 2 cwt. Superphosphate. 2 cwt. Kainit.

The Basic Slag to be high grade (84 per cent. citric soluble phosphates) and the Superphosphate to contain 35 per cent. soluble phosphates.

VI.—POTATOES.

MANURIAL TEST WITH SEAWEED FOR SEABOARD LOCALITIES.

Size of Plot : One-twentieth Statute Acre.

The following kinds and quantities of manures will be used per statute acre :—

No. of Plot.

1	15 tons Farmyard Manure.
2	15 tons Seaweed.
3	<div> <div>15 tons Seaweed.</div> <div> 1 cwt. Sulphate of Ammonia. 4 cwt. Superphosphate. 1 cwt. Muriate of Potash. </div> </div>
4	<div> <div>15 tons Seaweed.</div> <div> 4 cwt. Superphosphate. 1 cwt. Muriate of Potash. </div> </div>
5	<div> <div>15 tons Seaweed.</div> <div> 1 cwt. Sulphate of Ammonia. 4 cwt. Superphosphate. </div> </div>
6	<div> <div>15 tons Seaweed.</div> <div> 4 cwt. Superphosphate. </div> </div>

Class of Seaweed used should be noted, and also time and method of application.

VII.—ROTATION EXPERIMENT WITH LIME.

Size of Plot : Quarter Statute Acre.

The lime to be applied to stubble after lea oats.

Plot 1. No lime.

„ 2. Slaked lime (weighed before slaking, slaked with water, and applied in the form of powder). Two tons per statute acre.

„ 3. Ground burnt lime. Two tons per statute acre.

„ 4. Ground limestone. Four tons per statute acre.

Results to be obtained and furnished each year for four years following application.

It is essential that in any season during which the experiment lasts only one crop should be sown over the acre comprised in the experiment, and that this crop should be cultivated and manured alike over the entire area. When the land is under green crop, potatoes, swedes, *or* mangels should be planted on the whole area.

For purposes of exact comparison it is essential that *all* the lime and limestone for the experiments, including the lime for Plot 2, shall be obtained from either of the two following sources, viz., The Carnlough Lime Co., Carnlough, Co. Antrim; or, The Askeaton Carbide Co., Askeaton, Co. Limerick. Instructors should themselves determine from which of these centres the lime can be most conveniently obtained.

**DEPARTMENT OF AGRICULTURE AND TECHNICAL
INSTRUCTION FOR IRELAND.**

**SCHEME FOR ENCOURAGING IMPROVEMENT
IN THE DAIRY CATTLE OF IRELAND.**

Dairying, as well as the raising of store cattle, is one of the principal branches of agriculture in this country. It is, accordingly, of importance that the milking properties of Irish cattle should be preserved and improved. In dairy herds the yield and quality of milk given by each cow largely determine whether the animal realises a profit or entails a loss to the owner; consequently, it is essential that farmers should know exactly the quantity and quality of milk which each cow yields per annum. At the same time, as young cattle are a considerable source of revenue, it is desirable that the good milking cow should be of the type likely to produce a calf which will be of value for both beef and milk. With this object the Department, since 1909, have been encouraging the formation of Cow-Testing Associations.

COW-TESTING ASSOCIATIONS.

All owners of dairy cows are strongly advised to join cow-testing associations, or, if there is no association in their districts, to help where practicable to form such an association. Cow-testing associations enable their members not only to ascertain the quantity but also the quality of the milk yielded by each of their cows, and thus make it possible to determine which cows are worth retaining in a herd and which should be disposed of.

These associations are solely responsible for the correctness of the records kept by their members. In this connection it should be borne in mind that the value of a herd with records or of a young bull from a registered cow will depend mainly on the degree of confidence which other farmers place in the breeder's figures. This fact should induce farmers to bestow special care on the keeping of their milk records.

1. The Department are prepared to consider applications for the attendance of a lecturer at meetings of farmers to explain the objects and advantages of cow-testing associations. It is desirable that associations which are to come into operation in the beginning of any year should be formed as soon as possible after 1st November preceding. Applications will be dealt with in the order in which they are received.

2. A cow-testing association formed for the purpose of this scheme will, in order to be eligible for recognition by the Department, be required to undertake to comply with the following conditions :—

(a) To secure an entry of as many herds of milking cows as possible, each member being required to enter all his cows. No association will be recognised unless milk records for at least 100 cows are kept throughout the year by members of the association.

(b) To admit to membership all dairy farmers (cow owners) in the district served by the association. An association may, however, refuse to admit any person to membership, provided the association satisfies the Department as to the reason for such exclusion.

(c) To secure that the members shall have the milk of each cow weighed on every seventh day (the exact day of the week for each member being fixed by the association). The morning and evening milk shall be weighed and recorded separately on the byre record (Form A. 291) which will be provided by the Department.

(d) To arrange that, after every weighing, a sample of each cow's milk shall be taken and preserved until the end of the month, and that the composite sample for the month shall be tested for butter-fat.

(e) To appoint a competent supervisor whose duties shall be (i.) to ensure that the weekly records are properly kept, and to transfer them each month from the byre records to the monthly statements (Form A. 288) provided by the Department, (ii.) to carry out regularly the monthly butter-fat tests, (iii.) to record in the monthly statements the results of these tests, the calculated number of pounds of butter-fat contained in the milk and the value of such milk, (iv.) to investigate all cases of abnormal weights and tests, and take special samples to check same, (v.) to certify all particulars in respect of any cows submitted by members of the association for entry in the Department's Register, and (vi.) to prepare an annual statement of the work of the association on the prescribed form and to send a copy of such statement to the Department.

(f) To provide all apparatus, chemicals, etc., necessary for testing the samples of milk and to pay the supervisor at the rate of at least threepence per cow per monthly test.

(g) To permit the Department at any time to inspect the byre records, monthly statements, list of members, etc., as well as the milking of the cows and the testing of the milk samples.

3. When the Department are satisfied that a cow-testing association has been formed, and that suitable arrangements have been made to comply with the foregoing requirements,

they will be prepared (a) to supply the society with the necessary number of byre records and forms of monthly statement, and (b) for one year to contribute to the association at the rate of twopence per cow per monthly test towards the cost of employing a supervisor. The subsidy referred to at (b) will not be payable until the Department are satisfied that all requirements have been complied with.

Registration of Cows.

4. The Department will keep a Register of dairy cattle in which cows and their progeny may be entered subject to the provisions of this scheme. The inspection of cows with a view to entry on the Register will be carried out by the Department.

5. The Department, on receiving payment of a fee of 2s. 6d. for each cow, will be prepared to inspect at such centres as may be determined by them all cows which have given, during the milking period covered by the records, a yield of not less than 210 lbs. of butter-fat, provided that the calculated average percentage of butter-fat in the milk does not fall below 3 and the calculated yield of milk below 6,000 lbs. The Department will accept for entry in the Register all such animals which as a result of inspection they consider to be of good conformation and well-defined type. The fees will be refunded in respect of cows which are rejected.

Applications for the inspection of cows should be made to the Department on the prescribed form (A. 416) not later than 12th December, and should be accompanied by a certified record of the milk yield of each cow for a complete milking period. (See clause 9.)

6. The owner of each registered cow will be required to comply with the following conditions :—

(a) To have the animal served by a registered dairy bull or a pure-bred bull, of her own type, which has been passed by the Department as up to premium standard ;

(b) To furnish to the Department on the prescribed form (A. 66) within seven days from the date of birth, particulars regarding sex, colour, markings, etc., of each calf produced by a registered cow, and such particulars of the sire and dam as the Department may require ; and

(c) To keep on the prescribed form (A. 79) a record of the breeding, date of birth, etc., of progeny, for the purposes of future registration. This record must be open to inspection at any time by the Department.

7. When a registered cow or her calf has been disposed of, the Department must be notified of the fact within fourteen days

of the disposal of the animal, and at the same time advised of the name and address of the new owner.

The death of a registered cow or her calf must also be notified to the Department within fourteen days of the death of the animal.

Failure to observe this regulation may entail the removal from the Register of the animals entered in the name of the person in default.

8. In cases where the conditions of clauses 6 and 7 have been fully complied with, male progeny will be eligible for inspection with a view to provisional selection for premiums under the Department's Cattle Breeding Scheme, within the limits of age specified therein, and, if so selected, will be entered in the Register as "Registered Dairy Bulls."

Owners of male progeny eligible for inspection should apply on the prescribed form in the month of December for a certificate of eligibility, and for particulars of the show or centre at which the animal should be exhibited for inspection.

General.

9. For the purposes of this scheme the term "milking period" shall mean the period during which a cow continues to yield milk after calving. Provided that if such period exceeds 45 weeks the first 45 weeks after calving shall be regarded as the cow's milking period.

10. The Department reserve the right, without assigning any reason for their action, (a) to remove the name of any animal from their Register, and (b) to refuse to inspect or register any cow or the progeny of any registered cow.

11. The Department also reserve the right to modify or withdraw this scheme in whole or in part at any time.

12. In all cases of dispute in matters connected with this scheme the decision of the Department shall be final.

March, 1914.

II.—TECHNICAL INSTRUCTION.

Department of Agriculture and Technical Instruction for Ireland.

REGULATIONS FOR THE AWARD OF MEDALS AND PRIZES UNDER THE PROGRAMME OF TECHNICAL SCHOOL EXAMINATIONS.

A.—MEDALS.

A Silver Medal will be offered for competition each year in the Fourth Year examination of each of the Courses indicated below, viz. :—

- (1) Commerce (Course A.).
- (2) Commerce (Course B.).
- (3) Building Trades.
- (4) Applied Chemistry (i) Analytical Chemistry.
- (5) Applied Chemistry (ii) Industrial Chemistry.
- (6) Electrical Engineering (Course A.).
- (7) Electrical Engineering (Course B.).
- (8) Electrical Engineering (Course C.).
- (9) Mechanical Engineering (Course A.).
- (10) Mechanical Engineering (Course B.).
- (11) Domestic Economy.
- (12) Art (Group A.).
- (13) Art (Group B.).
- (14) Art (Group C.).

B.—PRIZES.

A First Prize of the value of £2, and a Second Prize of the value of £1, will be offered for competition each year in each of the separate subjects of the examinations in the Third and Fourth Years of the above mentioned Courses.

In the event of the winner of a medal not obtaining prizes, in the same year and Course, to the value of £2, a special prize not exceeding £2 in value will be awarded.

THE FOLLOWING CONDITIONS GOVERN THE FOREGOING AWARDS :—

- (1). The awards are restricted to candidates who have attended, in the current session, appropriate courses of study approved by the Department, and in respect of whose attendance at these courses grants are payable under the Programme for Technical Schools and Classes. Attendance for not less

than 100 hours in a School of Art recognised by the Department under the terms of Section V. of the Programme, will be accepted as satisfying this condition in the case of candidates for awards in the Art Course examinations.

(2). To qualify for a medal a candidate must obtain a First Class success in each subject of the examination in the year of award.

(3). A candidate who has not completed the examinations of the First and Second years of a Course is not eligible for a prize in respect of any subject of the Third Year examination of the Course. A candidate who has not completed the examinations of the First, Second and Third Years of a Course is not eligible for a prize or medal in respect of the Fourth Year examination of the Course.

(4). A candidate who has obtained a medal is not eligible in a subsequent year for any further award, under these Regulations, in the same Course. A candidate who has obtained a prize in a subject of the Fourth Year examination of any Course is not eligible to compete, in a subsequent year, for a prize in the Third Year examination of that Course, and a candidate who has obtained a prize in any subject of examination is not eligible to compete again for a prize in an examination on the same syllabus.

(5). No award will be made in respect of any examination unless sufficient merit is shown by the candidates.

(6). The prizes will be given in the form of books, instruments, etc., likely to assist candidates in their studies. The selection of the prizes will be left to the candidates, but will be subject to the approval of the Department.

(7). The Department of Agriculture and Technical Instruction will be the sole judge, in each case, of the qualifications of the candidate to receive a medal or prize.

FORM S. 106.

DEPARTMENT OF AGRICULTURE AND
TECHNICAL INSTRUCTION FOR IRELAND,
UPPER MERRION STREET, DUBLIN.

SPECIAL EXAMINATIONS IN ELEMENTARY MODELLING AND IN DRAWING ON THE BLACKBOARD, 1914.

The Department will hold in October and November, 1914, Special Examinations in Elementary Modelling and Drawing on the Blackboard, for Candidates for the Irish Secondary Teachers' Drawing Certificate, under the conditions of Circular 84; and in Blackboard Drawing for Candidates for the Teachers' Certificates in Drawing and Art specified in Form S. 240.

Should a sufficient number of applications be received, arrangements will be made to hold these Examinations in Dublin, Belfast, Cork, Londonderry, Limerick, Waterford, and Galway. Examinations may, however, in special circumstances, be held at other centres, but applications for such Examinations must be submitted separately not later than the 1st September, and must be accompanied by a statement of the circumstances in each case.

Applications for admission to the Examinations must be submitted not later than the 16th September, on Form S. 117 in the case of Elementary Modelling, and on Form S. 119 in the case of Drawing on the Blackboard. Copies of these forms may be obtained, after the 15th August, from the Offices of the Department.

The Department will not charge a fee for admission to these Examinations, but the Managers of the schools at which the Examinations will be conducted will be at liberty to charge each candidate a fee not exceeding 2s. 6d. for the accommodation provided.

FORM S. 194.

COMMERCIAL SCHOLARSHIPS.

DEPARTMENT OF AGRICULTURE AND
TECHNICAL INSTRUCTION FOR IRELAND,
UPPER MERRION STREET, DUBLIN.

COMMERCIAL SCHOLARSHIPS, 1914.

The Department will, in July, 1914, award a limited number of Commercial Scholarships (not more than six) to young men who have had a sound general education, and some commercial experience.

The object of the Scholarships is to afford facilities for the Holders to obtain training in some higher Institution, approved by the Department, with a view to their employment as teachers of Commercial Subjects in Ireland.

The Scholarships are of the value of £100 per annum each, and are tenable for two years. The Department, however, reserve the right to determine a Scholarship at any time within this period upon being satisfied that its continuance is for any reason undesirable.

The Scholarship holders will be selected by the Department on consideration of the qualifications and experience of the applicants.

Candidates must be at least twenty-one years of age on the 1st July, 1914, and must have been born in Ireland, or have been resident in Ireland for three years immediately preceding the 1st July, 1914.

Successful candidates will be required to enter into an undertaking that they will engage in the teaching of Commercial subjects after the termination of their Scholarships.

Certificates of good character will be required from all applicants, and candidates selected for Scholarships will be required to produce a medical certificate of health and an authenticated copy of certificate of birth.

The decision of the Department in regard to the selection of candidates or to any other question arising out of these Scholarships will be final.

Candidates must fill in Form S. 195 and return it to the Secretary of the Department not later than the 30th May, 1914. Copies of this Form may be had on application.

FORM S. 314.

DEPARTMENT OF AGRICULTURE AND
TECHNICAL INSTRUCTION FOR IRELAND,
UPPER MERRION STREET, DUBLIN.

SCHOLARSHIPS AT THE KILLARNEY SCHOOL OF
HOUSEWIFERY.

The Department are prepared to offer to County Committees of Technical Instruction special facilities for the award of Scholarships for Girls, tenable at the Killarney School of Housewifery. This institution is under the Department's direct control and has for its object the Training of Girls in such work as would fit them for domestic service or the care of a home.

The following are the conditions under which Scholarships may be awarded :—

1. Applicants for the Scholarships must be resident in a rural district, and must have been in regular attendance at one of the Courses of Instruction in Domestic Economy conducted by the Committee of Technical Instruction for the County, in the current or the previous session.

2. The scholars will be selected by the Department from the students nominated by County Committees of Technical Instruction. Each nomination must be accompanied by a report of the Domestic Economy Instructress upon the work of the applicant at the course of instruction attended.

3. Applicants for these Scholarships may be nominated for admission to the School on the 1st February or the 16th August. Nominations should be forwarded by County Committees so as to reach the offices of the Department on or before the 1st of January or the 16th July.

4. The Scholarships will be tenable for the full course of training, which extends over about forty-six weeks.

5. A fee of £8, being one-half of the usual fee, will be payable by the County Committee in respect of each applicant nominated by them who is awarded a Scholarship, and the parent or guardian of the scholar will be required to pay the entrance fee of £1.

6. Scholars will be required to conform to all the conditions set forth in the School Programme.

7. The Department reserve the right to determine a Scholarship without notice upon being satisfied that its continuance is for any reason undesirable.

8. The decision of the Department in all questions arising in connection with the Scholarships shall be final.

NOTES AND MEMORANDA.

The Department regret to announce that **Mr. Robert Cantrell, I.S.O.**, Chief Clerk, has been obliged, through impaired health, to resign his position. **Mr. Cantrell, I.S.O.** who has been Chief Clerk, of the Department since its establishment in 1900, and who had been previously Chief Clerk of the Veterinary Department of the Privy Council for Ireland, is one of the most eminent and respected members of the Irish Civil Service, in which he has served with loyalty and distinction for almost forty-six years,

The Department regard with the deepest regret the severance of his official connection with them. He takes into his retirement the cordial good wishes and esteem of all with whom he has served.

At the meeting of the Agricultural Board, on 26th March, 1914, the following resolution, proposed by the Most Rev. Dr. Kelly, Lord Bishop of Ross (Munster), and seconded by Mr. J. S. F. McCance (Ulster), was unanimously adopted :—

“The Board learn with much regret of the retirement, through impaired health, of Mr. Cantrell, Chief Clerk of the Department. They have valued the assistance which he has given them at all meetings of the Board since the beginning, and they have learned to appreciate the great abilities and the fine personal qualities which have made him throughout his very long service, one of the most esteemed members of the Irish Civil Service. The Board cordially wish him many years' enjoyment of his well-earned rest.”

The vacancy caused by Mr. Cantrell's retirement has been filled by the promotion to the Chief Clerkship, of Mr. James Dermot Daly, M.A., Senior Staff Officer.

Mr. Herbert Gainfort Smith, M.A., LL.D., Private Secretary to the Vice-President, has been appointed Senior Staff Officer in room of Mr. Daly.

A meeting of the Agricultural Board was held at the Offices of the Department, Upper Merrion Street, Dublin, on Wednesday, the 4th February, 1914. The following were present :—The Right Hon. T. W. Russell, P.C., M.P., Vice-President of the Department, in the Chair ; Mr. Alexander L. Clark, J.P. ; Very Rev. Canon Daly, D.D., P.P. ; Mr. Robert Downes ; Colonel Sir Nugent Everard, Bart., H.M.L. ; Sir Josslyn Gore-Booth, Bart., D.L. ; Most Rev. Denis Kelly, D.D., Lord Bishop of Ross ; Mr. George Murnaghan, J.P. ; and Mr. David L. O'Gorman.

Alderman Henry Dale, J.P. ; the Most Rev. Dr. Healy, Lord Archbishop of Tuam ; Mr. John S. F. McCance, J.P., and Mr. P. J. O'Neill, J.P., were unavoidably prevented from attending the meeting.

Mr. T. P. Gill, Secretary of the Department ; Mr. J. R. Campbell, Assistant Secretary in respect of Agriculture ; Mr. J. S. Gordon, Deputy Assistant Secretary in respect of Agriculture and Chief Agricultural Inspector ; Mr. T. Butler, Superintendent of the Statistics and Intelligence Branch ; Mr. J. P. Walsh, Clerk in Charge of Accounts ; Mr. J. D. Daly, M.A. (who acted as Secretary to the meeting), and Mr. J. V. Coyle, were also present.

The Board had under consideration a report as to the working of the County Agricultural Schemes and of the Agricultural Schools and Stations ; special schemes in the congested districts ; the Weeds and Agricultural Seeds Act.

The following, among other matters, were also under consideration :—Grants from the Development Fund ; the exportation of potatoes to America ; the Dairy Cattle Scheme ; and certain matters relating to fishery administration.

The Vice-President reported to the Board the action taken by the Department with a view to dealing with the situation created by the recent outbreak of Foot and Mouth Disease in County Kildare.

Another meeting of the Board was held at the Offices of the Department, Upper Merrion Street, Dublin, on Thursday, the 26th March, 1914. Mr. T. P. Gill, Secretary of the Department, presided in the unavoidable absence of the Vice-President who was detained in London on Parliamentary business. The following members were also present :—Mr. Alexander L. Clark, J.P. ; Very Rev. Canon Daly, D.D., P.P. ; Mr. Robert Downes ; Colonel Sir Nugent Everard, Bart., H.M.L. ; Sir Josslyn Gore-Booth, Bart., D.L. ; Most Rev. Denis Kelly, D.D., Lord Bishop of Ross ; Mr. John S. F. McCance, J.P. ; Mr. George Murnaghan, J.P. ; Mr. David L. O'Gorman, J.P. ; and Mr. P. J. O'Neill, J.P.

The Most Rev. Dr. Healy, Lord Archbishop of Tuam, was unavoidably prevented from attending the meeting.

Mr. J. R. Campbell, Assistant Secretary in respect of Agriculture ; Mr. J. S. Gordon, Deputy Assistant Secretary in respect of Agriculture and Chief Agricultural Inspector ; Mr. T. Butler, Superintendent of the Statistics and Intelligence Branch ; Mr. J. P. Walsh, Clerk in Charge of Accounts ; Mr. J. D. Daly, M.A. (who acted as Secretary to the meeting), and Mr. J. V. Coyle, were also present.

The first of this year's series of Surprise Butter Inspections, conducted by the Department of Agriculture and Technical Instruction for Ireland, was held on **Surprise Butter Inspections, 1914.** 25th March, 1914. The judges were butter merchants of Birmingham and Cork.

Exhibits were received from sixty-four creameries. The marks awarded to each exhibit were for (1) Flavour, (2) Texture, (3) Colour, (4) Packing and Finish, as well as the percentage of water contained in the butter.

The following creameries obtained the highest awards at the Inspection :—

NAME OF CREAMERY.	Position Awarded.
Ballyclough Co-operative Creamery, Ltd., Mallow	1
Abbeydorney Co-operative Dairy Society, Ltd.	2
Coachford Creamery (Newmarket Dairy Co., Ltd.)	3
Drumholm C.A. and D. Society, Ltd.	4
Effin C.A. and D. Society, Ltd.	4
Pomeroy C.A. and D. Society, Ltd.	4
Ballyhahill C.D. Society, Ltd.	7
Drumquin Co-operative Creamery, Ltd.	7
Scottish C.W. Society, Ltd., Enniskillen	7
Abington Co-operative Creamery Co., Ltd.	10
Achonry C.A. and D. Society, Ltd.	10
Ballinahinch Farmers' Co-operative Creamery, Ltd.	10
Colman's Well Co-operative Creamery Ltd.	10
Killen C.A. and D. Society, Ltd.	10
Rattoo C.A. and D. Society, Ltd.	10
Moneymore C.A. and D. Society	16
Ahoghill C.A. and D. Society, Ltd.	17
Castlemahon C.A. and D. Society, Ltd.	17
Dromkeen C.A. and D. Society, Ltd.	17
Irvinestown C.A. and D. Society, Ltd.	17
Suirvale C.A. and D. Society, Ltd., Cahir	17

The second of the series was held on 1st April, 1914. The judges were butter merchants of Limerick and Manchester.

The following creameries obtained the highest awards at this Inspection :—

NAME OF CREAMERY	Position Awarded.
Scottish C.W. Society, Ltd., Enniskillen	1
Leckpatrick C.A. and D. Society, Ltd.	2

NAME OF CREAMERY;	Position Awarded.	
Belleek C.A. and D. Society, Ltd.	3
Thurles C.A. and D. Society, Ltd.	3
Killyman C.A. and D. Society, Ltd.	5
Moneymore C.A. and D. Society, Ltd.	5
Killen C.A. and D. Society, Ltd.	7
Mitchelstown Creamery (Newmarket Dairy Co., Ltd.)	..	7
Ballyhahill C.D. Society, Ltd.	9
Beltrim C.A. and D. Society, Ltd.	9
Rattoo C.A. and D. Society, Ltd.	9
Toomevara C.A. and D. Society, Ltd.	9
Abington Co-operative Creamery Co., Ltd.	..	13
Ballyclough Co-operative Creamery, Ltd.	13
Derrygonnelly C.A. and D. Society, Ltd.	13
Glenmore C.D. Society, Ltd.	13
Greencastle C.A. and D. Society, Ltd.	13
Lissarda C.D. Society, Ltd, County Cork	13
Newcastle West Co-operative Dairy Society, Ltd.	13
Irvinestown Co-operative A. and D. Society, Ltd.	20
Ballinahinch Farmers' Co-operative Creamery, Ltd.	21
Borrisoleigh Co-operative Dairy Society, Ltd.	21
Castlemahon C.A. and D. Society, Ltd.	21
Drumholm C.A. and D. Society, Ltd.	21
Glenwilliam C.D. Society, Ltd.	21

STATISTICAL TABLES.

STATISTICAL

FISHERY STATISTICS—

STATEMENT of the Total QUANTITY and VALUE of the Fish returned compared with the

	North Coast				East Coast.			
	1914.		1913.		1914.		1913.	
	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.
	Cwt.	£	Cwt.	£	Cwt.	£	Cwt.	£
Brill,	—	—	—	—	10	27	75	222
Soles,	1	6	—	—	32	150	27	177
Turbot,	—	—	—	—	24	129	20	129
Total Prime Fish, .	1	6	—	—	66	306	122	528
Cod,	3,178	1 889	2,538	1,904	709	562	1,041	1,130
Conger Eel,	5	2	40	32	95	89	474	426
Haddock,	44	49	91	51	109	107	507	536
Hake,	—	—	—	—	69	104	509	680
Herrings,	32,445	8 876	68 786	26,459	7,930	2,866	3,906	962
Ling,	97	50	5	3	75	79	603	599
Mackerel,	3,797	550	812	451	—	—	—	—
Plaice,	31	31	—	—	321	376	98	129
Ray or Skate,	438	98	214	88	118	113	420	261
Sprats,	—	—	—	—	—	—	—	—
Whiting,	10	4	11	11	294	253	575	588
All other except Shell Fish	182	67	224	83	263	228	529	527
Total,	40,228	11,622	72,721	29,082	10,049	5,083	8,784	6,366
SHELL FISH :—	No.		No.		No.		No.	
Crabs,	396	1	1,032	2	—	—	—	—
Lobsters,	—	—	144	4	2,648	159	1,115	69
Mussels,	Cwt.	—	Cwt.	—	Cwt.	—	Cwt.	46
Oysters,	No.	—	No.	—	No.	—	No.	2
Other Shell Fish, .	Cwt.	5	Cwt.	3	Cwt.	22	Cwt.	61
Total,	—	6	—	9	—	181	—	178
Total value of Fish landed	—	11,628	—	29,091	—	5,264	—	6,544

NOTE.—The above figures are subject

TABLES.**IRELAND.**

as landed on the IRISH COASTS during the month of January, 1914, as corresponding period in 1913.

South Coast.				West Coast.				Total.			
1914.		1913.		1914.		1913.		1914.		1913.	
Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Cwt.	£	Cwt.	£	Cwt.	£	Cwt.	£	Cwt.	£	Cwt.	£
2	5	—	—	5	10	5	11	17	42	80	233
14	53	11	49	43	149	36	153	90	358	74	379
1	2	—	—	20	98	12	51	45	229	32	180
17	60	11	49	68	257	53	215	152	629	186	792
14	17	29	19	463	266	347	194	4,364	2,734	3,955	3,247
—	—	—	—	76	31	70	35	176	122	584	493
5	6	20	20	451	340	303	244	609	502	921	851
—	—	—	—	—	—	200	123	69	104	709	803
1,322	602	1,044	326	281	116	902	322	41,978	12,460	74,638	28,069
—	—	—	—	62	44	114	75	234	173	722	677
4,268	1,233	252	90	21,136	5,946	598	208	29,201	7,729	1,662	747
87	91	32	39	123	112	58	60	562	610	188	228
—	—	7	2	125	34	159	22	681	245	800	373
77	16	5	2	—	—	—	—	77	16	5	2
8	3	33	27	287	124	283	189	599	384	902	815
65	29	64	34	112	74	207	70	622	398	1,024	714
5,863	2,057	1,497	608	23,184	7,344	3,294	1,755	79,324	26,106	86,296	37,811
No.	—	No.	—	No.	—	No.	—	No.	396	No.	2
—	—	—	—	1,236	52	1,872	83	3,884	211	1,032	156
Cwt.	8	Cwt.	6	Cwt.	260	Cwt.	383	Cwt.	268	Cwt.	435
60	—	63	—	1,971	—	1,787	—	2,031	—	2,356	—
No.	—	No.	—	No.	—	No.	—	No.	—	No.	—
4,662	9	4,284	9	65,106	91	15,276	31	69,768	100	20,568	42
Cwts.	—	Cwt.	—	Cwt.	—	Cwt.	—	Cwt.	—	Cwt.	—
513	165	395	108	773	166	801	209	1,408	358	1,362	381
—	182	—	123	—	569	—	706	—	938	—	1,016
—	2,239	—	731	—	7,913	—	2,461	—	27,044	—	38,827

to correction in Annual Returns.

FISHERY STATISTICS—

STATEMENT of the Total QUANTITY and VALUE of the FISH returned compared with the

—	North Coast.				East Coast.			
	1914.		1913.		1914.		1913.	
	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.
	Cwt.	£	Cwt.	£	Cwt.	£	Cwt.	£
Brill,	—	—	—	—	45	119	27	103
Soles,	—	—	—	—	29	136	21	131
Turbot,	—	—	1	2	22	95	18	96
Total Prime Fish, . .	—	—	1	2	96	350	66	330
Cod,	1,378	871	1,379	829	1,036	1,077	1,641	1,571
Conger Eel,	93	26	13	10	270	225	555	438
Haddock,	—	—	79	26	209	188	514	473
Hake,	—	—	—	—	293	384	555	780
Herrings,	55,344	9,164	73,044	23,365	4,066	1,478	2,317	589
Ling,	34	15	4	3	344	324	657	539
Mackerel,	2,018	705	597	214	26	16	—	—
Plaice,	28	28	5	6	217	311	373	401
Ray or Skate,	268	80	210	62	253	209	402	241
Sprats,	—	—	—	—	—	—	—	—
Whiting,	3	1	3	1	492	334	792	761
All other except Shell Fish	438	154	361	189	282	240	598	559
Total,	59,604	11,044	75,696	24,707	7,584	5,136	8,470	6,685
SHELL FISH:—	No.		No.		No.		No.	
Crabs,	1,008	2	912	2	—	—	—	—
Lobsters,	48	2	204	6	975	70	1,661	97
	Cwt.		Cwt.		Cwt.		Cwt.	
Mussels,	—	—	—	—	—	—	514	46
	No.		No.		No.		No.	
Oysters,	—	—	—	—	1,638	3	3,024	5
	Cwt.		Cwt.		Cwt.		Cwt.	
Other Shell Fish, . .	12	2	37	6	198	67	205	74
Total,	—	6	—	14	—	140	—	222
Total value of Fish landed	—	11,050	—	24,721	—	5,276	—	6,907

NOTE.—The above figures are subject

IRELAND.

as Landed on the Irish Coasts during the month of February, 1914, as corresponding period in 1913.

South Coast.				West Coast.				Total.			
1914.		1913.		1911.		1913.		1914.		1913.	
Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Cwt.	£	Cwt.	£	Cwt.	£	Cwt.	£	Cwt.	£	Cwt.	£
1	1	—	—	2	4	14	32	48	124	41	135
13	49	11	41	35	146	95	434	77	331	127	606
—	—	—	—	15	75	30	188	37	170	49	286
14	50	11	41	52	225	139	654	162	625	217	1,027
7	5	26	20	347	213	1,662	841	2,768	2,166	4,708	3,261
—	—	—	—	26	8	110	45	389	259	678	493
—	—	19	19	256	210	1,328	733	465	398	1,940	1,251
—	—	—	—	—	—	—	—	293	384	555	780
179	69	39	25	16	11	636	160	59,605	10,722	76,036	24,139
—	—	—	—	46	49	459	255	424	388	1,120	797
253	90	441	150	600	310	1,313	480	2,897	1,121	2,351	853
22	20	59	35	106	101	347	311	373	460	784	753
—	—	2	1	53	18	308	71	574	307	922	378
—	—	11	2	—	—	—	—	—	—	11	2
5	1	10	13	126	76	257	102	626	412	1,062	877
53	35	47	37	119	79	317	135	892	508	1,323	920
533	270	665	352	1,747	1,300	6,876	3,787	69,468	17,750	91,707	35,531
No.	—	No.	—	No.	—	No.	—	No.	2	No.	2
—	—	—	—	696	33	2,428	82	1,008	105	912	185
Cwt.	—	Cwt.	—	Cwt.	33	Cwt.	—	Cwt.	17,719	Cwt.	4,293
85	13	40	5	1,525	180	1,330	262	1,610	193	1,884	313
No.	—	No.	—	No.	—	No.	—	No.	—	No.	—
5,544	11	0,930	14	24,810	43	22,258	42	31,992	57	32,212	61
Cwt.	—	Cwt.	—	Cwt.	—	Cwt.	—	Cwt.	—	Cwt.	—
415	116	325	34	588	117	805	223	1,243	302	1,372	337
—	140	—	53	—	373	—	609	—	659	—	898
—	410	—	405	—	1,673	—	4,396	—	18,409	—	36,429

to correction in Annual Returns.

FISHERY STATISTICS—

STATEMENT of the Total QUANTITY and VALUE of the Fish returned compared with the

	North Coast.				East Coast.			
	1914.		1913.		1914.		1913.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Cwt.	£	Cwt.	£	Cwt.	£	Cwt.	£
Brill,	—	—	—	—	38	91	40	91
Soles,	—	—	—	—	23	103	16	82
Turbot,	—	—	—	—	34	161	22	77
Total Prime Fish, .	—	—	—	—	95	355	78	250
Cod,	84	72	99	77	1,551	1,324	1,981	1,683
Conger Eel,	26	14	11	4	612	520	567	463
Haddock,	—	—	—	—	589	528	411	377
Hake,	—	—	—	—	504	557	663	816
Herrings,	1,984	672	3,586	902	187	74	—	—
Ling,	14	11	4	3	561	524	801	622
Mackerel,	62	32	59	21	—	—	—	—
Plaice,	132	134	43	46	434	760	350	406
Ray or Skate, . . .	143	49	73	27	408	338	463	309
Sprats,	—	—	—	—	—	—	—	—
Whiting,	—	—	—	—	966	750	480	401
All other except Shell Fish	119	32	126	35	310	283	675	640
Total,	2,564	1,016	4,001	1,115	6,217	6,013	6,469	5,967
SHELL FISH:— . . .	No.		No.		No.		No.	
Crabs,	828	5	1,500	3	—	—	—	—
Lobsters,	312	8	36	1	1,040	83	1,324	59
Mussels,	—	—	—	—	362	89	468	41
Oysters,	—	—	—	—	17,514	23	4,158	7
Other Shell Fish, .	33	5	21	3	449	121	255	106
Total,	—	18	—	7	—	316	—	213
Total value of Fish landed	—	1,034	—	1,122	—	6,329	—	6,180

NOTE.—The above figures are subject

IRELAND.

. as landed on the IRISH COASTS during the month of March, 1914, as corresponding period in 1913.

South Coast.				West Coast.				Total.			
1914.		1913.		1914.		1913.		1914.		1913.	
Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.
Cwt.	£	Cwt.	£	Cwt.	£	Cwt.	£	Cwt.	£	Cwt.	£
1	1	—	—	20	41	28	54	59	133	68	145
15	63	13	46	129	614	204	1,003	167	780	233	1,131
—	—	2	10	16	78	41	174	50	239	65	261
16	64	15	56	185	733	273	1,231	276	1,152	366	1,537
11	15	16	11	624	329	1,445	746	2,270	1,740	3,541	2,517
—	—	—	—	177	120	9	4	815	654	587	471
—	—	10	10	238	176	3,383	1,379	827	704	3,804	1,766
—	—	3	1	—	—	—	—	504	557	666	817
—	—	—	—	55	34	36	10	2,226	780	3,622	912
—	—	—	—	35	33	116	63	610	568	921	688
488	248	231	137	141	77	180	85	691	357	470	243
191	150	97	75	242	221	349	338	999	1,265	839	865
—	—	5	2	238	41	431	63	789	428	972	401
—	—	—	—	—	—	—	—	—	—	—	—
10	2	39	19	129	74	134	39	1,105	826	653	459
50	23	53	32	212	66	728	286	691	404	1,582	993
766	502	469	343	2,256	1,904	7,084	4,214	11,803	9,435	18,023	11,669
No.	—	No.	—	No.	—	No.	—	No.	828	No.	1,500
—	—	—	—	—	—	—	—	—	5	—	3
—	—	36	2	612	28	2,088	72	1,994	119	3,484	134
Cwt.	—	Cwt.	—	Cwt.	—	Cwt.	—	Cwt.	912	Cwt.	893
90	14	30	4	460	63	395	61	—	166	—	106
No.	—	No.	—	No.	—	No.	—	No.	—	No.	—
5,040	10	6,678	13	6,720	14	6,906	14	29,274	47	17,742	34
Cwt.	—	Cwt.	—	Cwt.	—	Cwt.	—	Cwt.	—	Cwt.	—
456	90	406	61	538	112	1,143	223	1,476	328	1,825	393
—	114	—	80	—	217	—	370	—	665	—	670
—	616	—	423	—	2,121	—	4,614	—	10,100	—	12,339

to correction in Annual Returns.

STATEMENT of the TOTAL QUANTITY of FISH landed on the ENGLISH and WELSH COASTS during the Month and Three Months ended 31st March, 1914, compared with the corresponding periods of the Year 1913.

	March.		Three months ended 31st March.	
	1914.	1913.	1914.	1913.
QUANTITY.				
	Cwt.	Cwt.	Cwt.	Cwt.
Brill,	1,843	1,253	5,836	4,758
Soles,	6,244	5,610	19,724	16,818
Turbot,	6,265	4,043	20,250	14,824
Prime Fish not separately distinguished,	49	—	119	5
Total Prime Fish,	14,401	10,906	45,929	36,405
Bream,	6,034	4,227	17,158	12,331
Catfish,	10,543	12,562	18,478	22,565
Coalfish,	71,356	38,805	123,751	91,070
Cod,	280,999	285,160	717,217	720,512
Conger Eels,	4,038	3,991	13,589	12,536
Dabs,	12,854	7,805	33,765	25,925
Dogfish,	2,034	2,404	11,728	17,61
Dory,	161	128	849	342
Flounders or Flukes,	912	610	2,433	2,047
Gurnards,	11,786	6,209	25,822	17,375
Haddock,	87,810	102,740	242,108	299,241
Hake,	39,076	26,896	89,141	86,571
Halibut,	5,730	6,810	13,432	16,577
Latchets (Tubs),	314	304	972	827
Lemon Soles,	4,257	4,167	9,119	9,125
Ling,	22,569	19,690	47,594	52,624
Megrims,	5,848	4,935	14,504	12,619
Monks (or Anglers),	2,996	3,031	9,411	10,672
Mullet (Red),	14	28	52	179
Plaice,	54,747	41,235	160,542	128,808
Pollack,	2,643	3,021	4,494	6,201
Skates and Rays,	23,464	26,635	91,149	86,454
Torsk,	2,125	2,209	4,618	4,801
Whiting,	46,009	33,521	152,847	118,536
Witches,	4,130	3,503	10,103	12,788
Herrings,	1,469	514	25,828	12,278
Mackerel,	16,183	29,772	20,052	42,839
Mullet (Grey)	22	46	169	164
Pilchards,	—	—	148	—
Sprats,	98	—	49,108	19,426
Whitebait,	353	721	1,153	1,862
Fish not separately distinguished,	41,940	34,470	104,941	85,695
Total,	732,943	717,115	2,061,679	1,967,008
Shell Fish :—	No.	No.	No.	No.
Crabs,	694,676	463,386	1,046,268	759,820
Lobsters,	36,431	29,548	62,059	51,250
Oysters,	2,272,988	2,731,955	8,251,721	9,139,131
Other Shell Fish,	Cwt.	Cwt.	Cwt.	Cwt.
	37,039	44,281	154,080	145,948

NOTE.—The figures for 1914 are subject to correction.

STATEMENT of the TOTAL VALUE of FISH landed on the ENGLISH and WELSH COASTS during the Month and Three Months ended 31st March, 1914, compared with the corresponding periods of the Year 1913.

	March.		Three months ended 31st March.	
	1914.	1913.	1914.	1913.
	VALUE.			
	£	£	£	£
Brill,	6,040	5,002	18,741	18,341
Soles,	42,518	40,921	122,039	123,600
Turbot,	26,005	21,745	87,110	77,781
Prime Fish not separately distinguished,	82	—	194	7
Total Prime Fish,	74,645	67,668	228,134	219,738
Bream,	3,163	2,457	9,953	6,784
Catfish,	5,851	5,740	10,400	10,663
Coalfish,	18,970	13,473	37,607	35,801
Cod,	180,236	193,921	513,679	524,693
Conger Eels,	3,049	3,207	10,452	10,048
Dabs,	13,017	9,238	35,092	30,049
Dogfish,	763	939	4,314	7,004
Dory,	181	163	470	429
Flounders or Flukes,	666	382	1,620	1,350
Gurnards,	3,845	2,386	8,918	6,677
Haddock,	92,089	108,764	270,390	307,141
Hake,	49,155	37,397	121,027	112,350
Halibut,	21,077	26,661	53,735	71,190
Latchet (Tubs),	168	185	544	470
Lemon Soles,	12,956	13,228	30,041	30,824
Ling,	11,433	10,560	26,230	28,912
Megrims,	5,620	5,486	15,093	13,650
Monks (or Anglers),	2,083	1,859	6,500	6,888
Mullet (Red)	40	88	133	582
Plaice,	78,064	70,036	230,677	219,055
Pollack,	1,770	2,340	3,426	4,571
Skates and Rays,	24,161	20,818	75,349	66,305
Torsk,	917	1,214	2,447	2,999
Whiting,	31,880	28,273	112,027	90,172
Witches,	5,350	5,883	13,815	18,950
Herrings,	324	133	13,620	5,292
Mackerel,	11,657	18,297	15,025	27,576
Mullet (Grey),	51	115	365	371
Pilchards,	—	—	57	—
Sprats,	15	—	9,855	4,397
Whitebait,	816	1,640	2,466	4,299
Fish not separately distinguished,	24,185	21,499	63,817	51,603
Total,	681,262	673,750	1,926,553	1,920,733
Shell Fish :—				
Crabs,	6,182	4,721	9,723	8,100
Lobsters,	2,153	1,650	3,684	2,936
Oysters,	7,977	8,754	29,550	30,136
Other Shell Fish,	8,189	8,001	28,213	26,922
Total,	21,501	23,726	71,170	68,094
Total value of all Fish,	705,763	697,476	1,997,723	1,988,827

NOTE.—The figures for 1914 are subject to correction.

STATEMENT of the TOTAL QUANTITY of the FISH landed on the SCOTTISH COASTS during the Month and Three Months ended 31st March, 1914, compared with the corresponding periods of the year 1913.

	March.		Three Months ended 31st March.	
	1914.	1913.	1914.	1913.
	Quantity			
	Cwt.	Cwt.	Cwt.	Cwt.
Herrings }	89,984	98,381	863,958	626,197
Sprats	20	40	4,741	2,088
Sparlings	26	13	102	67
Mackerel	833	2,304	10,389	4,784
Cod	105,227	121,533	231,707	276,986
Codling				
Ling	23,481	11,099	51,178	35,782
Torsk (Tusk)	2,346	1,233	4,209	3,040
Saith (Coal Fish)	36,605	23,495	86,622	71,718
Haddocks, Extra Large	42,025	57,727	127,487	189,747
Do. Large				
Do. Medium				
Do. Small	20,392	13,278	69,971	47,288
Whitings				
Congor Eels	6,910	4,669	16,723	16,512
Gurnards	408	152	1,037	584
Catfish	3,134	3,429	5,777	6,623
Monks (Anglers)	2,073	1,276	6,978	5,338
Hake	1,667	563	3,916	2,123
Squids	—	—	10	9
Turbot	306	235	862	821
Halibut	3,522	2,029	6,216	4,761
Lemon Soles	2,193	1,848	5,011	5,262
Flounders	870	645	1,443	2,400
Plaice, Large	4,085	4,289	10,423	11,961
Do. Medium				
Do. Small				
Brill	32	12	87	52
Dabs	740	794	2,284	2,376
Witches	1,492	1,473	7,121	7,807
Megrims	1,767	1,624	5,074	4,486
Skates and Rays	19,254	11,174	48,745	34,965
Unclassified Kinds	499	612	4,249	2,599
Total	369,389	363,927	1,576,320	1,366,376
	No.	No.	No.	No.
Shell Fish :—				
Crabs	293,550	123,613	569,621	420,092
Lobsters	39,024	27,875	115,464	106,094
Oysters	98,000	170,200	320,740	562,960
	Cwt.	Cwt.	Cwt.	Cwt.
Clams	807	843	2,234	5,473
Mussels	3,710	5,651	18,542	22,108
Unclassified	6,137	5,246	12,363	13,757

NOTE.—The above figures are subject to correction in the Annual Returns

Statement of the TOTAL VALUE of the FISH landed on the SCOTTISH COASTS during the Month and Three Months ended 31st March, 1914, compared with the corresponding periods of the year 1913.

	March.		Three Months ended 31st March.	
	1914.	1913.	1914.	1913.
	Value			
	£	£	£	£
Herrings	18,786	18,203	193,060	174,740
Sprats	7	14	509	310
Sparling	93	86	343	219
Mackerel	313	461	3,438	1,348
Cod				
Codling	55,020	59,445	139,531	145,485
Ling	9,361	4,546	20,090	15,001
Torsk (Tusk)	848	471	1,684	1,186
Saith (Coal Fish)	7,713	3,660	19,957	13,407
Haddocks, Extra Large				
Do. Large				
Do. Medium	39,430	47,825	122,084	149,115
Do. Small				
Whittings	14,908	7,245	46,808	23,961
Conger Eels	3,064	2,248	7,532	7,292
Gurnards	91	29	233	99
Catfish	928	792	2,025	1,753
Monks (Anglers)	725	423	2,242	2,029
Hake	1,865	624	5,101	2,414
Squids	—	—	1	—
Turbot	924	942	2,741	3,010
Halibut	8,831	6,308	17,272	14,331
Lemon Soles	6,123	5,640	15,546	15,358
Flounders	251	442	945	1,716
Plaice, Large				
Do. Medium	6,783	7,509	17,627	18,585
Do. Small				
Brill	55	24	151	121
Dabs	308	318	992	917
Witches	2,134	2,081	9,085	9,323
Megrims	2,612	2,455	7,359	6,286
Skates and Rays	6,789	3,738	16,973	11,184
Unclassified kinds	102	121	449	435
Total	188,072	175,657	653,778	619,625
Shell Fish :—				
Crabs	1,660	741	3,196	2,178
Lobsters	2,640	1,676	8,019	6,371
Oysters	333	592	1,201	1,972
Clams	121	127	328	685
Mussels	218	335	1,051	1,249
Unclassified	1,518	1,170	3,258	3,018
Total Value	6,520	4,641	17,053	15,473
Total Value of all Fish	194,592	180,298	670,831	635,098

NOTE.—The above figures are subject to correction in the Annual Returns.

STATEMENT of the TOTAL QUANTITY and VALUE of the FISH returned as landed on the IRISH COASTS during the Month and Three Months ended 31st March, 1914, compared with the corresponding periods of the Year 1913.

	March.		Three Months ended 31st March.	
	1914.	1913.	1914.	1913.
QUANTITY.				
Brill,	Cwt. 59	Cwt. 68	Cwt. 124	Cwt. 189
Soles,	167	233	334	434
Turbot,	50	65	132	146
Total Prime Fish,	276	366	590	769
Cod,	2,270	3,541	9,402	12,204
Conger Eel,	815	587	1,380	1,849
Haddock,	827	3,804	1,901	6,665
Hake,	504	666	866	1,930
Herrings,	2,226	3,622	103,809	154,296
Ling,	610	921	1,268	2,763
Mackerel,	691	470	32,789	4,483
Plaice,	999	839	1,934	1,811
Ray or Skate,	789	972	2,044	2,694
Sprats,	—	—	77	16
Whiting,	1,105	653	2,330	2,617
Fish not separately distinguished, except Shell Fish,	691	1,582	2,205	3,929
Total,	11,803	18,023	160,595	196,026
Shell Fish :—	No.	No.	No.	No.
Crabs,	828	1,500	2,232	3,444
Lobsters,	1,994	3,484	7,597	10,908
Oysters,	29,274	17,742	131,034	70,522
Mussels,	Cwt. 912	Cwt. 893	Cwt. 4,553	Cwt. 5,183
Other Shell Fish,	1,476	1,825	3,117	4,559
VALUE.				
Brill,	£ 133	£ 145	£ 299	£ 513
Soles,	780	1,181	1,469	2,116
Turbot,	239	261	638	727
Total Prime Fish,	1,152	1,537	2,406	3,356
Cod,	1,740	2,517	6,640	9,025
Conger Eel,	654	471	1,035	1,457
Haddock,	704	1,766	1,604	3,868
Hake,	557	817	1,045	2,400
Herrings,	780	912	23,962	53,120
Ling,	568	688	1,129	2,162
Mackerel,	357	243	9,207	1,843
Plaice,	1,265	865	2,335	1,846
Ray or Skate,	428	401	980	1,152
Sprats,	—	—	16	4
Whiting,	826	459	1,622	2,151
Fish not separately distinguished, except Shell Fish,	404	993	1,810	2,627
Total,	9,435	11,669	53,291	85,011
Shell Fish :—				
Crabs,	5	3	8	7
Lobsters,	119	134	435	476
Oysters,	47	34	204	137
Mussels,	168	106	627	854
Other Shell Fish,	328	393	983	1,111
Total,	665	670	2,262	2,584
Total Value of Fish landed,	10,100	12,339	55,553	87,595

NOTE.—The above figures are subject to correction in the Annual Returns.

QUARTERLY AVERAGE PRICES OF CROPS, LIVE STOCK, MEAT, PROVISIONS, &c.,
for the period ended 31st March, 1914

PRODUCT.	PROVINCE.				IRELAND.	
	Leinster.	Munster.	Ulster.	Con-naught.	1914.	1913.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
CROPS:—						
Wheat, . . . per 112 lbs.	7 5	6 8	—	—	7 5	7 6½
Oats (White) . . . "	6 8½	6 9½	6 1½	6 5½	6 3	6 11½
" (Black) . . . "	5 8½	5 7	—	—	5 7½	6 5½
Barley, . . . "	7 2½	7 1½	—	—	7 1½	—
Potatoes . . . "	2 11	3 7	2 2½	3 3½	3 0	3 11½
Hay (Clover) . . . "	4 0½	3 0½	2 11	3 2½	3 2½	3 6
" (Meadow) . . . "	2 10½	2 1½	1 6	2 2½	2 4½	2 4½
Grass Seed—						
(Perennial Rye) . . . "	—	—	8 9	—	8 9	11 9½
(Italian Rye) . . . "	—	—	—	—	—	—
Flax . . . per 14 lbs.	—	—	6 9	—	6 9	8 3½
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
LIVE STOCK:—						
Calves (young) per head	2 6 0	2 2 6	1 13 0	2 17 6	2 5 9	2 7 0
Store Cattle—						
Over 6 and not exceeding 12 months per head	5 12 3	5 9 6	5 11 6	5 19 6	5 12 6	5 9 0
One year old and under two years per head	9 3 0	9 4 0	8 9 9	8 18 9	9 0 9	9 0 0
Two years old and under three years per head	12 2 0	12 0 0	11 3 0	11 16 3	11 18 0	11 15 0
Three years old and over „	14 1 3	11 17 0	—	14 7 0	13 18 0	13 14 9
Fat Cattle—						
Two years old and under three years per head	15 2 0	14 19 6	15 7 3	15 3 9	15 3 9	14 8 1
Three years old and over „	16 17 0	15 4 3	17 16 9	15 14 9	16 13 3	17 1 3
Cows and Bulls per head	14 13 6	12 9 9	14 18 0	15 3 3	13 9 6	13 10 7
Springers—						
Cows and Heifers per head	15 14 6	14 13 3	15 7 9	15 5 6	15 3 9	14 14 6
Milch Cows (down calved) „	14 6 3	14 11 0	14 8 0	13 10 3	14 3 3	13 10 9
Lambs (under 12 months old) per head	1 16 9	1 17 6	—	1 14 0	1 16 6	1 14 3
Store Sheep—						
One year old and under two years per head	1 16 3	1 19 6	1 8 9	2 0 3	1 17 3	1 17 7
Two years old and over „	1 15 0	—	—	—	1 14 6	1 13 5
Fat Sheep—						
One year old and under two years per head	2 8 6	2 12 9	2 5 0	2 13 9	2 11 0	2 8 9
Two years old and over „	2 11 6	2 12 3	2 10 3	3 0 0	2 12 9	2 7 11
Young Pigs—						
8 to 10 weeks old „	1 6 9	1 11 9	1 15 6	1 12 3	1 12 9	1 4 4
Store Pigs—						
10 weeks to 4 months old „	1 19 9	1 14 0	2 17 3	—	1 18 9	1 11 7
4 months old and over „	2 12 0	2 3 0	—	—	2 6 6	2 2 3
Fat Pigs . . . „	4 0 6	4 7 9	—	6 0 6	5 6 0	4 11 2
Sows, . . . „	6 5 0	6 18 0	7 6 0	8 0 0	7 3 6	6 3 11
MEAT, PROVISIONS, &c.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Beef (Live) . . . per 112 lbs.	—	—	—	—	35 0	36 1
" (Dead) . . . "	—	—	—	—	61 3	63 2
Mutton (Live) . . . "	—	—	—	—	45 9	42 0
" (Dead) . . . "	—	—	—	—	80 0	73 6
Pork (Live) . . . "	60 9	64 1	61 10	61 9	63 9	62 0
Butter (Creamery) . . . "	116 3	118 9	—	—	118 8	119 5
" (Factory) . . . "	101 2	98 10	—	—	98 10	97 4
" (Farmers') . . . "	95 1	106 10	94 5	—	101 9	98 9
Eggs . . . per 120 „	10 8½	10 1½	—	9 3½	10 2½	9 6½
Wool . . . per lb.	1 0½	—	—	1 0½	1 0½	1 0½

WEEKLY AVERAGE PRICES of WHEAT, OATS, and BARLEY, per 112 lbs.
computed from Market Returns of certain quantities of these Cereals
supplied by Officers of Customs and Excise, during the QUARTER
ended 31st March, 1914.

Returns received in the Week ended	WHEAT.		OATS.		BARLEY.	
	Average Price per 112 lbs.	Quantity.	Average Price per 112 lbs.	Quantity.	Average Price per 112 lbs.	Quantity
1914.	s. d.	Cwts. of 112 lbs.	s. d.	Cwts. of 112 lbs.	s. d.	Cwts. of 112 lbs.
January 3	7 4	750	6 0½	4,255	7 1½	496
" 10	7 4	750	5 11½	5,849	7 4½	46
" 17	7 3½	500	5 11½	7,230	6 6	28
" 24	7 3½	1,125	5 10	6,303	7 7½	200
" 31	7 5½	750	5 11½	6,735	—	—
February 7	7 4½	518	6 1½	4,356	—	—
" 14	7 7¼	400	6 0	5,687	6 3	80
" 21	7 7	550	6 0¾	5,833	—	—
" 28	7 6	590	6 0½	5,619	—	—
March 7	7 6	500	6 1½	4,743	—	—
" 14	7 4½	250	6 0½	3,062	—	—
" 21	—	—	6 3	3,521	—	—
" 28	7 7¼	250	6 4½	4,152	—	—

QUARTERLY AVERAGE PRICES of FAT CATTLE and FAT SHEEP, per 112 lbs., LIVE
WEIGHT, sold in DUBLIN MARKETS during the period ended 31st
MARCH, 1914, and also for the corresponding period during seventeen
preceding years.

Year.	Fat Cattle.	Fat Sheep.	Year.
	£ s. d.	£ s. d.	
1914.	1 15 0	2 5 9	1914.
1913.	1 16 1	2 2 0	1913.
1912.	1 16 3	1 17 4	1912.
1911.	1 13 4	1 17 6	1911.
1910.	1 13 8	1 19 6	1910.
1909.	1 13 2	1 12 2	1909.
1908.	1 12 9	2 0 0	1908.
1907.	1 12 0	2 3 2	1907.
1906.	1 10 11	2 2 6	1906.
1905.	1 11 5	1 19 9	1905.
1904.	1 10 9	1 19 7	1904.
1903.	1 13 10	2 1 1	1903.
1902.	1 12 6	1 14 8	1902.
1901.	1 12 5	1 16 10	1901.
1900.	1 13 2	1 17 5	1900.
1899.	1 11 8	1 14 1	1899.
1898.	1 9 9	1 16 10	1898.
1897.	1 11 4	1 17 0	1897.

**NUMBER of ANIMALS included in Returns furnished under the MARKETS and FAIRS (Weighing of Cattle) ACT, 1891, Sections 3 and 4,
during the Quarter ended 31st March, 1914.**

WEEK ENDED	FAT CATTLE.					FAT SHEEP.			
	Dublin.		Belfast.		Total Number of Cattle included in Returns.	Dublin.		Belfast.	Total Number of Sheep included in Returns.
	Corporation Market Authorities.	Mr. Gavin Low, Auctioneer.	Corporation Market Authorities.	Mr. John Robson, Auctioneer.		Corporation Market Authorities.	Mr. Gavin Low, Auctioneer.		
1914.									
January 1	74	178	61	59	372	—	210	—	210
" 8	78	161	69	51	359	—	302	—	302
" 15	65	144	69	70	348	—	225	—	225
" 22	37	196	65	108	406	—	136	—	136
" 29	50	180	64	106	400	—	286	—	286
February 5	44	56	64	68	232	20	138	—	158
" 12	54	122	68	87	331	—	209	—	209
" 19	29	41	64	74	208	—	128	—	128
" 26	55	69	68	78	270	—	262	—	262
March 5	48	37	63	70	218	7	123	—	130
" 12	56	110	66	48	280	—	249	—	249
" 19	61	160	71	52	334	—	185	—	185
" 26	63	182	69	57	371	—	211	—	211
Totals,	714	1,626	861	928	4,129	27	2,664	—	2,691

BUTTER PRICES DURING THE QUARTER

ABSTRACTED FROM "THE GROCER," "GROCER'S REVIEW,"

Excepting 1-lb. Rolls and Farmers' Butter all quotations are the
an Irish Creamery would be 5s. to 7s. per cwt. less than
freight, commission,

COUNTRY OF ORIGIN.	Type of Package.	Place of Sale.	WEEK ENDED			
			JANUARY			
			3rd.	10th.	17th.	24th.
IRELAND— Creamery Butter.	Kieis, kegs, or pyramid boxes	London, .	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.
		Liverpool, .	—	—	—	—
		Bristol, .	—	—	—	—
		Cardiff, .	—	—	—	—
		Manchester, .	—	122-125	—	—
		Birmingham, .	—	—	—	—
		Glasgow, .	—	—	—	—
		Limerick, .	—	—	—	—
		Cork, .	—	—	—	—
		Belfast, .	—	—	—	—
		Dublin, .	—	—	—	—
		F.O.R., .	—	140	140	140
Factories.	1lb. rolls, in boxes, Salted or Unsalted.	London, .	98-104	96-104	98-104	99-105
		Liverpool, .	102-108	—	—	100-104
		Bristol, .	—	—	98-108	98-108
		Cardiff, .	98-108	106-110	104-108	104-106
		Manchester, .	—	—	—	—
Farmers' Butter,	Firkins 1st, Export Price Do. 2nd " Do. 3rd " Fresh, "	Cork, .	118	118	118	118
		Cork, .	103	96-109	96-101	98-105
		Cork, .	90	86-87	86-89	—
		Cork, .	111-118	107-112	104-110	104-110
		Cork, .	—	—	—	—
FRANCE,	12x21b. rolls, Paris baskets,	London, .	Per doz. lbs. 13-16	Per doz. lbs. 13-16	Per doz. lbs. 13-16	Per doz. lbs. 13-16
		do., .	Per cwt. 124-137	Per cwt. 124-137	Per cwt. 124-137	Per cwt. 124-137
		do., .	—	—	—	—
DENMARK AND SWEDEN.	Kieis, .	Copenhagen Quotation.	111 Kr. 124/2 per 50 cwt. Kilos	108 Kr. 120/7 per 50 cwt. Kilos	106 Kr. 118/6 per 50 cwt. Kilos	106 Kr. 118/6 per 50 cwt. Kilos
		Average over- price,	—	—	—	—
		London, .	130-138	127-130	125-128	124-127
		Liverpool, .	127-132	129-132	123-129	120-127
		Bristol, .	—	—	—	—
		Cardiff, .	137	137	134	128
		Manchester, .	129-135	126-132	123-128	122-127
		Birmingham, .	132-134	130-134	127-130	125-128
		Newcastle-on- Tyne, .	129-131	125-130	122-127	123-127
		Glasgow, .	132-133	130-131	125-126	124-125
		Leith, .	—	130-131	125/6	122/6
		Hull, .	130-132	128-130	123-128	123-125
FINLAND	Kieis, .	F.O.R. Lon- don	—	—	—	—
		Manchester, .	127-131	125-130	122-128	120-125
		Liverpool, .	126-128	—	122-125	119-123
		Hull, .	124-126	122-123	119-120	117-119
		Cardiff, .	—	—	—	—

ENDED 31ST MARCH, 1914.

"GROCER'S GAZETTE," AND OTHER TRADE REPORTS.

Landed Prices of the Choicest Qualities. The Nett F.O.R. Price to the Landed Prices in Great Britain. This figure covers handling, &c.

WEEK ENDED								
FEBRUARY.					MARCH.			
31st.	7th.	14th.	21st.	28th.	7th.	14th.	21st.	28th.
Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	118-120	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
140	140	140	140	140-144/8	135/4-140	130/8-140	116-119 126-135/4	116-121/4 121/4-135/4
100-105	—	—	—	—	—	—	—	—
98-108	98-108	98-108	98-108	—	100-104	—	—	—
98-104	96-100	100-104	—	96	102-106	—	—	—
—	—	—	—	—	—	—	—	—
118	118-120	120	120	120	120	120	120	120
101-102	98-104	98-102	101-102	100-104	100-103	101-104	100-102	100-102
86	86-93	93	87	—	—	94-98	95-98	95-98
106-107	107-110	106-109	107-110	105-110	105-108	105-109	103-107	101-106
Per doz. lbs. 13-16 Per cwt. 124-137	Per doz. lbs. 13-16 Per cwt. 124-137	Per doz. lbs. 13-16 Per cwt. 124-137	Per doz. lbs. 13-16 Per cwt. 124-137	Per doz. lbs. 3-16 Per cwt. 124-137	Per doz. lbs. 13-16 Per cwt. 124-137	Per doz. lbs. 13-16 Per cwt. 124-137	Per doz. lbs. 13-16 Per cwt. 124-137	Per doz. lbs. 12/6-15/6 Per cwt. 120-133
107 Kr. 119/8 per 50 cwt. Kilos	105 Kr. 117/11 per 50 cwt. Kilos	103 Kr. 115/6 per 50 cwt. Kilos	104 Kr. 116/7 per 50 cwt. Kilos	106 Kr. 118/6 per 50 cwt. Kilos	106 Kr. 118/6 per 50 cwt. Kilos	104 Kr. 116/7 per 50 cwt. Kilos	104 Kr. 116/7 per 50 cwt. Kilos	104 Kr. 116/7 per 50 cwt. Kilos
125-128	123-126	120-123	121-124	123-126	124-126	121-124	122-124	122-124
121-127	122-128	115-126	118-125	119-127	120-128	120-127	115-126	118-126
124-128	122-130	122-127/6	120-126	122-130	118-133	120-132	122-127	122-130
123-128	121-128	114/6-125	117-124	122-127	122-128	119-126	120-126	122-127
125-128	126-128	123-126	123-125	124-126	126-128	125-128	124-127	125-127
124-127	122-126	119-123	119-124	122-127	123-126	121-124	123-126	124-126
125-126	125-126	123-124	122-123	124-125	126-127	124-125	121-122	124-125
125	125	121-123	120/6	123/6	126-127	125/6	121-122	123/6
122-126	122-124	121-122	120-124	123-126	123-126	122-124	121-123	112-125
120-124	118-125	112/6-122	116-122	119-124	118-125	115-124	116-122	118-123
120-123	121-124	116-120	118-122	117-121	117-121	117-121	115-119	116-119
118-119	118-122	115-116	118-113	112-113	114-116	114-115	113-114	112-115

[Continued on pages 600 and 601]

BUTTER PRICES DURING THE QUARTER **ABSTRACTED FROM "THE GROCER," "GROCER'S REVIEW,"**

Excepting 1-lb. Rolls and Farmers' Butter all quotations are the
an Irish Creamery would be 5s. to 7s. per cwt. less than
freight, commission,

COUNTRY OF ORIGIN	Type of Package.	Place of Sale.	WEEK ENDED.			
			JANUARY			
			3rd.	10th.	17th.	24th.
RUSSIA AND SIBERIA,	Kieis,	London,	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.
		Liverpool,	108-114	108-112	108-112	110-112
		Bristol,	102-112	102-114	104-114	102-112
		Cardiff,	100-116	—	106-114	106-114
		Manchester,	—	106-115	106-110	108-112
		Birmingham,	102-121	102-114	106-114	117-119
		Glasgow,	112-116	112-116	112-116	112-116
		Leith,	114-116	114-116	114-116	114-116
		Hull,	—	—	—	100-104
		—	—	—	—	—
HOLLAND,	Boxes,	London,	Per doz. lbs.	Per doz. lbs.	Per doz. lbs.	Per doz. lbs.
	Rolls,	do.,	—	15-15/6	15-15/6	15-15/6
	Boxes,	Glasgow,—	Per cwt.	Per cwt.	Per cwt.	Per cwt.
		Freeb,	—	—	—	—
		Salt,	—	—	—	—
		Manchester,	—	—	—	—
ITALY,	Rolls,	Hull,	132-133	131-132	135-137	—
		—	—	—	—	—
CANADA,	56 lb. boxes,	London,	Per doz. lbs.	Per doz. lbs.	Per doz. lbs.	Per doz. lbs.
		—	—	—	—	—
AUSTRALIA AND NEW ZEALAND,	Boxes,	London,	Per cwt.	Per cwt.	Per cwt.	Per cwt.
		Liverpool,	—	—	—	—
		Bristol,	—	—	—	—
		Cardiff,	—	—	—	—
		Birmingham,	—	—	—	—
		Manchester,	—	—	—	—
		Glasgow,	—	—	—	—
		—	—	—	—	—
		—	—	—	—	—
		—	—	—	—	—
ARGENTINA,	Boxes,	London,	A.s. 110-116	A.s. 110-115	A.s. 110-115	A.s. 108-112
		Liverpool,	u. 110-114	u. 110-115	u. 110-115	u. 110-116
		Bristol,	Z. 118-122	Z. 116-120	Z. 116-120	Z. 112-120
		Cardiff,	A. 115-119	A. 110-117	A. 108-116	A. 108-118
		Birmingham,	Z. 123-126	Z. 118-123	Z. 118/6-122	Z. 116-119
		Manchester,	A. 118-122	A. 117-120	A. 112-118	A. 110-116
		Glasgow,	Z. 124-126	Z. 123-125	Z. 120-124	A. 118-122
		Leith,	A. 116-122	A. 116-122	A. 115-121	A. 111-118
		Hull,	Z. 122-126	Z. 122-124	Z. 122-124	Z. 118-122
		—	A. 118-123	A. 116-118	A. 115-119	A. 113-118
UNITED STATES,	Tubs and boxes,	London,	Z. —	Z. 123-124	Z. 122-124	Z. 120-122
		Liverpool,	A. 120-124	A. 116-120	A. 115-119	Z. 118-118
		Bristol,	Z. —	Z. —	Z. —	Z. 119-120
		Cardiff,	A. 120-122	A. 117-119	A. 116-118	A. 116-118
		Birmingham,	Z. 124-125	Z. 122-124	Z. 120-122	Z. 118-120
		Manchester,	A. 118-120	A. 114-116	A. 115-117	A. 114-116
		Glasgow,	Z. —	Z. —	Z. —	Z. 118-120
		Leith,	A. 118-120	A. 118-120	A. 116-118	A. 115-117
		Hull,	Z. —	Z. —	Z. —	Z. —
		—	A. 118-120	A. 118-120	A. 116-118	A. 115-117

A.—Australia.

Z.—New Zealand.

s.—salted.

u.—unsalted

ENDED 31st MARCH, 1914—Continued.

"GROCER'S GAZETTE," AND OTHER TRADE REPORTS.

Landed Prices of the Choicest Qualities. The Nett F.O.R. Price to the Landed Prices in Great Britain. This figure covers handling, &c.

[illegible]

TABLES SHOWING THE EXPORTS

TABLE

RETURN of the NUMBER of ANIMALS EXPORTED from IRELAND to GREAT
the PORTS OF EMBARKATION

IRISH PORTS.	CATTLE.							SHEEP.			
	Fat.	Stores (fatten- ing).	Milch Cows.	Spring- ers.	Other Cattle.	Calves.	Total.	Fat.	Stores.	Lambs.	Total.
Ballina, . .	164	—	—	—	76	—	240	16	—	—	16
Belfast, . .	3,866	3,993	389	758	27	17	9,050	159	—	—	159
Coleraine, . .	11	45	—	—	—	—	56	—	—	—	—
Cork, . . .	1,830	3,457	257	512	50	629	6,735	1,796	—	—	1,796
Drogheda, . .	3,993	162	81	—	—	—	4,236	656	—	—	656
Dublin, . . .	20,084	6,398	2,359	76	—	190	29,107	8,714	—	—	8,714
Dundalk, . .	3,486	492	101	23	—	—	4,102	1,026	—	—	1,026
Dundrum, . .	—	—	—	—	—	—	—	—	—	—	—
Greenore, . .	90	813	107	76	—	—	1,086	—	—	—	—
Larne, . . .	30	1,662	1	28	—	280	2,001	—	—	—	—
Limerick, . .	48	51	—	—	272	—	371	—	—	—	—
Londonderry, . .	1,535	2,184	80	279	27	781	4,886	613	—	—	613
Milford, . . .	9	19	—	—	—	—	28	—	—	—	—
Mulroy, . . .	4	29	—	—	—	—	33	20	—	—	20
Newry, . . .	179	314	3	—	—	—	496	127	—	—	127
Portrush, . .	—	32	—	—	—	—	32	—	—	—	—
Rosslare, . . .	—	—	—	—	—	—	—	—	—	—	—
Sligo, . . .	154	14	—	—	246	10	424	91	—	—	91
Warrenpoint, . .	—	—	—	—	—	—	—	—	—	—	—
Waterford, . .	5,488	4,171	12	33	36	441	10,181	2,331	—	—	2,331
Westport, . . .	88	53	—	5	51	—	197	764	—	—	764
Wexford, . . .	—	—	—	—	—	—	—	—	—	—	—
TOTAL, . .	41,059	23,889	3,390	1,790	785	2,348	73,261	16,313	—	—	16,313

TABLE

RETURN of the NUMBER of ANIMALS EXPORTED from IRELAND to GREAT
the PORTS OF DEBARKATION

BRITISH PORTS.	CATTLE.							SHEEP.			
	Fat.	Stores (fatten- ing).	Milch Cows.	Spring- ers.	Other Cattle.	Calves.	Total	Fat.	Stores.	Lambs.	Total.
Ardrossan, .	—	—	—	—	—	—	—	—	—	—	—
Ayr, . . .	580	2,469	6	101	—	45	3,201	—	—	—	—
Barrow, . .	—	78	6	31	—	—	115	—	—	—	—
Bristol, . .	409	2,421	58	76	—	241	3,205	181	—	—	181
Cardiff, . .	26	—	—	—	—	—	26	68	—	—	68
Dover, . . .	—	—	—	—	—	—	—	—	—	—	—
Falmouth, .	—	—	—	—	—	—	—	—	—	—	—
Fishguard, .	1,171	3,245	143	381	14	766	5,720	2,270	—	—	2,270
Fleetwood, .	323	324	185	137	2	—	971	159	—	—	159
Glasgow, . .	5,141	3,809	513	682	741	921	11,807	93	—	—	93
Greenock, .	486	878	2	9	—	20	1,395	—	—	—	—
Heysham, . .	2,115	2,719	775	91	—	—	5,700	859	—	—	859
Holyhead, .	9,570	3,594	1,153	136	—	43	14,496	2,968	—	—	2,968
Liverpool, .	19,479	2,702	538	118	28	60	22,925	9,273	—	—	9,273
London, . .	—	—	—	—	—	—	—	—	—	—	—
Manchester, .	1,699	—	10	—	—	—	1,709	452	—	—	452
Newhaven, .	—	—	—	—	—	—	—	—	—	—	—
Plymouth, . .	—	—	—	—	—	—	—	—	—	—	—
Preston, . .	—	—	—	—	—	—	—	—	—	—	—
Silloth, . . .	30	12	—	—	—	—	42	—	—	—	—
Southampton, .	—	—	—	—	—	—	—	—	—	—	—
Stranraer, . .	30	1,638	1	28	—	252	1,949	—	—	—	—
Whitehaven, .	—	—	—	—	—	—	—	—	—	—	—
TOTAL, . . .	41,059	23,889	3,390	1,790	786	2,348	73,261	16,313	—	—	16,313

AND IMPORTS OF ANIMALS.

I.

BRITAIN during the Three Months ended 31st MARCH, 1914, showing
IN IRELAND.

SWINE.			Goats.	HORSES.				Mules or Jennets	Asses.	Total Animals	IRISH PORTS.
Fat.	Stores.	Total.		Stal- lions.	Mares.	Geld- ings.	Total.				
196	—	196	—	—	—	1	1	—	—	453	Ballina.
422	2	424	—	2	529	882	1,413	4	14	11,064	Belfast.
—	—	—	—	—	1	4	5	—	—	61	Coleraine.
2,597	—	2,597	—	4	99	204	307	—	127	11,562	Cork.
238	29	267	—	—	11	10	21	—	—	5,180	Drogheda.
16,320	32	16,352	1	27	1,032	747	1,806	1	38	56,019	Dublin.
3,451	55	3,506	—	—	160	79	239	—	15	8,888	Dundalk.
—	—	—	—	—	—	—	—	—	—	—	Dundrum.
187	—	187	—	—	1,119	719	1,838	—	1	3,112	Greenore.
1	49	50	—	1	54	112	167	—	5	2,223	Larne.
—	—	—	—	—	—	—	—	—	—	371	Limerick.
140	—	140	—	—	18	29	47	—	3	5,689	Londonderry.
2	—	2	—	—	—	—	—	—	—	30	Milford.
82	—	82	—	—	—	1	1	—	—	136	Mulroy.
531	—	531	—	—	5	1	6	—	1	1,161	Newry.
6	—	6	—	—	—	—	—	—	—	38	Portrush.
—	—	—	—	—	—	—	—	—	—	—	Rosslare.
2,365	—	2,365	1	—	1	2	3	—	2	2,886	Silgo.
5,305	—	5,305	—	1	323	488	812	—	145	18,774	Warrenpoint.
342	—	342	—	—	—	1	1	—	1	1,305	Waterford.
—	—	—	—	—	—	—	—	—	—	—	Westport.
—	—	—	—	—	—	—	—	—	—	—	Wexford.
32,185	167	32,352	2	35	3,352	3,280	6,667	5	352	128,952	TOTAL.

II.

BRITAIN during the Three Months ended 31st MARCH, 1914, showing
IN GREAT BRITAIN.

SWINE.			Goats.	HORSES.				Mules or Jennets	Asses.	Total Animals	BRITISH PORTS.
Fat.	Stores.	Total.		Stal- lions.	Mares.	Geld- ings.	Total.				
—	—	—	—	—	123	249	372	1	14	387	Ardrossan.
1	—	1	—	—	27	62	89	—	—	3,291	Ayr.
363	—	363	—	2	9	15	26	3	—	507	Barrow.
1,359	—	1,359	—	—	10	10	20	—	56	4,821	Bristol.
13	—	13	—	—	—	—	—	—	—	97	Cardiff.
—	—	—	—	—	—	—	—	—	—	—	Dover.
—	—	—	—	—	—	—	—	—	—	—	Falmouth.
3,240	—	3,240	—	4	356	558	918	—	120	12,268	Fishguard.
30	—	30	—	—	266	359	625	—	1	1,786	Fleetwood.
1,435	2	1,437	—	—	170	276	446	—	6	13,789	Glasgow.
10	—	10	—	—	1	3	4	—	—	1,409	Greenock.
2,386	—	2,386	—	—	85	127	212	—	—	9,157	Heysham.
12,661	32	12,693	—	27	1,898	1,248	3,173	1	1	33,332	Holyhead.
10,604	84	10,688	1	—	300	217	517	—	125	43,529	Liverpool.
—	—	—	—	—	—	—	—	—	—	—	London.
83	—	83	1	—	36	25	61	—	—	2,306	Manchester.
—	—	—	—	—	3	5	8	—	1	9	Newhaven.
—	—	—	—	1	4	5	10	—	—	10	Plymouth.
—	—	—	—	—	8	2	10	—	—	10.	Preston.
—	—	—	—	—	—	—	—	—	—	42	Silloth.
—	—	—	—	—	2	7	9	—	23	32	Southampton.
—	49	49	—	1	54	112	167	—	5	2,170	Stranraer.
—	—	—	—	—	—	—	—	—	—	—	Whitehaven.
32,185	167	32,352	2	35	3,352	3,280	6,667	5	352	128,952	TOTAL.

TABLE

RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from GREAT
the PORTS OF

IRISH PORTS.	CATTLE.							SHEEP.			
	Fat.	Stores (fatten- ing).	Milch Cows.	Spring- ers.	Other Cattle.	Calves.	Total.	Fat.	Stores.	Lambs.	Total.
Ballina, . . .	—	—	—	—	—	—	—	—	—	—	—
Belfast, . . .	—	—	—	—	6	—	6	2,068	181	—	2,249
Coleraine, . . .	—	—	—	—	—	—	—	—	—	—	—
Cork, . . .	—	1	—	—	—	—	1	—	—	—	—
Drogheda, . . .	—	—	—	—	—	—	—	—	—	—	—
Dublin, . . .	—	38	1	1	—	—	40	156	—	—	156
Dundalk, . . .	—	—	—	—	—	—	—	—	—	—	—
Dundrum, . . .	—	—	—	—	—	—	—	—	—	—	—
Greenore, . . .	—	—	—	—	—	—	—	—	—	—	—
Larne, . . .	—	—	—	5	—	—	5	152	—	—	152
Limerick, . . .	—	—	—	—	—	—	—	—	—	—	—
Londonderry, . . .	—	14	—	—	—	—	14	—	—	—	—
Millford, . . .	—	—	—	—	—	—	—	—	—	—	—
Mulroy, . . .	—	—	—	—	—	—	—	—	—	—	—
Newry, . . .	—	—	—	—	—	—	—	—	—	—	—
Portrush, . . .	—	—	—	—	—	—	—	—	—	—	—
Rosslare, . . .	—	—	—	—	—	—	—	—	—	—	—
Sligo, . . .	—	—	—	—	—	—	—	—	—	—	—
Warrenpoint, . . .	—	—	—	—	—	—	—	—	—	—	—
Waterford, . . .	—	—	—	—	—	—	—	—	17	—	17
Westport, . . .	—	—	—	—	—	—	—	—	—	—	—
Wexford, . . .	—	—	—	—	—	—	—	—	—	—	—
TOTAL, . . .	—	53	1	6	6	—	66	2,376	198	—	2,574

TABLE

RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from GREAT
the PORTS of EMBARKATION

BRITISH PORTS.	CATTLE.							SHEEP.			
	Fat.	Stores (fatten- ing).	Milch Cows.	Spring- ers.	Other Cattle.	Calves.	Total.	Fat.	Stores.	Lambs.	Total.
Ardrossan, . . .	—	—	—	—	4	—	4	1,184	87	—	1,271
Ayr, . . .	—	—	—	—	—	—	—	1,036	94	—	1,130
Barrow, . . .	—	—	—	—	—	—	—	—	—	—	—
Bristol, . . .	—	—	—	—	—	—	—	—	—	—	—
Cardiff, . . .	—	—	—	—	—	—	—	—	—	—	—
Falmouth, . . .	—	—	—	—	—	—	—	—	—	—	—
Fishguard, . . .	—	—	—	—	—	—	—	—	—	—	—
Fleetwood, . . .	—	—	—	—	—	—	—	—	—	—	—
Glasgow, . . .	—	37	1	1	2	—	41	156	17	—	173
Greenock, . . .	—	1	—	—	—	—	1	—	—	—	—
Heysham, . . .	—	—	—	—	—	—	—	—	—	—	—
Holyhead, . . .	—	2	—	—	—	—	2	—	—	—	—
Liverpool, . . .	—	1	—	—	—	—	1	—	—	—	—
London, . . .	—	—	—	—	—	—	—	—	—	—	—
Manchester, . . .	—	—	—	—	—	—	—	—	—	—	—
Newhaven, . . .	—	—	—	—	—	—	—	—	—	—	—
Plymouth, . . .	—	—	—	—	—	—	—	—	—	—	—
Preston, . . .	—	—	—	—	—	—	—	—	—	—	—
Silloth, . . .	—	12	—	—	—	—	12	—	—	—	—
Southampton, . . .	—	—	—	—	—	—	—	—	—	—	—
Stranraer, . . .	—	—	—	5	—	—	5	—	—	—	—
Swansea, . . .	—	—	—	—	—	—	—	—	—	—	—
TOTAL, . . .	—	53	1	6	6	—	66	2,376	198	—	2,574

III.

BRITAIN during the Three Months ended 31st MARCH, 1914, showing
DEBARKATION IN IRELAND.

SWINE.			Goats.	HORSES.				Mules or Jennets	Asses.	Total Animals	IRISH PORTS.
Fat.	Stores.	Total.		Stal- lions.	Mares.	Geld- ings.	Total.				
—	—	—	—	4	32	62	98	—	—	2,353	Ballina.
—	—	—	—	15	17	17	49	—	—	50	Belfast.
—	—	—	—	18	238	140	396	—	—	593	Coleraine.
—	1	1	—	—	1	1	2	—	—	2	Cork.
—	—	—	—	2	9	6	17	—	—	17	Drogheda.
—	—	—	—	10	3	2	16	—	—	172	Dublin.
—	—	—	—	3	3	5	11	—	—	25	Dundalk.
—	—	—	—	—	—	—	—	—	—	—	Dundrum.
—	—	—	—	—	—	1	1	—	—	1	Greenore.
—	—	—	—	—	1	—	—	—	—	—	Larne.
—	—	—	—	—	—	—	—	—	—	—	Limerick.
—	—	—	—	—	—	—	—	—	—	—	Londonderry.
—	—	—	—	—	—	—	—	—	—	—	Millford.
—	—	—	—	—	—	1	1	—	—	1	Mulroy.
—	—	—	—	—	1	—	—	—	—	1	Newry.
—	—	—	—	—	—	—	—	—	—	—	Portrush.
—	—	—	—	—	—	1	1	—	—	1	Rossare.
—	—	—	—	—	—	—	—	—	—	—	Silgo.
—	—	—	—	5	32	29	66	—	—	83	Warrenpoint.
—	—	—	—	—	—	—	—	—	—	—	Waterford.
—	—	—	—	—	—	—	—	—	—	—	Westport.
—	—	—	—	—	—	—	—	—	—	—	Wexford.
—	1	1	—	57	336	265	658	—	—	3,299	TOTAL.

IV.

BRITAIN during the Three Months ended 31st MARCH, 1914, showing
IN GREAT BRITAIN.

SWINE.			Goats.	HORSES.				Mules or Jennets	Asses.	Total Animals	BRITISH PORTS.
Fat.	Stores.	Total.		Stal- lions.	Mares.	Geld- ings.	Total.				
—	—	—	—	—	1	4	5	—	—	1,280	Ardrossan.
—	—	—	—	1	4	5	10	—	—	1,140	Ayr.
—	—	—	—	—	3	—	3	—	—	6	Barrow.
—	—	—	—	—	—	—	—	—	—	—	Bristol.
—	—	—	—	—	—	—	—	—	—	—	Cardiff.
—	—	—	—	—	—	—	—	—	—	—	Falmouth.
—	—	—	—	11	28	35	74	—	—	74	Fishguard.
—	—	—	—	2	16	11	29	—	—	29	Fleetwood.
—	—	—	—	5	21	24	50	—	—	265	Glasgow.
—	1	1	—	1	3	3	7	—	—	8	Greenock.
—	—	—	—	1	3	6	10	—	—	10	Heysham.
—	—	—	—	14	225	120	359	—	—	361	Holyhead.
—	—	—	—	1	13	43	57	—	—	58	Liverpool.
—	—	—	—	—	1	1	2	—	—	2	London.
—	—	—	—	—	2	1	3	—	—	3	Manchester.
—	—	—	—	—	—	—	—	—	—	—	Newhaven.
—	—	—	—	8	12	1	21	—	—	21	Plymouth.
—	—	—	—	—	—	—	—	—	—	—	Preston.
—	—	—	—	8	1	2	6	—	—	18	Silloth.
—	—	—	—	—	—	2	2	—	—	2	Southampton.
—	—	—	—	10	3	2	15	—	—	20	Stranraer.
—	—	—	—	—	—	2	2	—	—	2	Swansea.
—	1	1	—	57	336	265	658	—	—	3,299	TOTAL.

RETURN of the NUMBER of ANIMALS EXPORTED from IRELAND to the
showing the PORTS of

IRISH PORTS.	CATTLE.					SHEEP.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.
BELFAST, .	—	—	—	—	—	—	—	—
DUBLIN, .	—	—	—	—	—	—	—	—
TOTAL, .	—	—	—	—	—	—	—	—

RETURN of the NUMBER of ANIMALS EXPORTED from IRELAND to the
showing the PORTS of DEBARKATION

ISLE OF MAN PORT.	CATTLE.					SHEEP.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.
DOUGLAS, .	—	—	—	—	—	—	—	—

RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from the
showing the PORTS of

IRISH PORTS.	CATTLE.					SHEEP.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.
BELFAST, .	—	—	—	—	—	—	—	—
DUBLIN, .	—	—	—	—	—	—	—	—
TOTAL, .	—	—	—	—	—	—	—	—

RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from the
showing the PORTS of EMBARKATION

ISLE OF MAN PORT.	CATTLE					SHEEP.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.
DOUGLAS, .	—	—	—	—	—	—	—	—

**ISLE OF MAN during the Three Months ended 31st March, 1914,
EMBARKATION in IRELAND.**

SWINE.			Goats	HORSES.				Mules or Jennets.	Asses.	Total Animals.	IRISH PORTS.
Fat.	Stores.	Total.		Stallions	Mares.	Geldings	Total.				
—	—	—	—	—	—	—	—	—	—	—	BELFAST. DUBLIN.
—	—	—	—	—	—	—	—	—	—	—	TOTAL

ISLE OF MAN during the Three Months ended 31st March, 1914,
in the ISLE OF MAN.

[illegible]

ISLE OF MAN during the Three Months ended 31st March, 1911,
DEBARKATION in IRELAND.

[illegible]

ISLE OF MAN during the Three Months ended 31st March, 1914,
in the ISLE OF MAN.

[illegible]

COASTING AND

RETURN OF THE NUMBER OF ANIMALS SHIPPED to and from Places in
the Places of Embarkation

IRISH PORTS.	CATTLE.					SHEEP.			SWINE.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.	Fat.	Stores.	Total.
Cork to Aghada Pier, .	—	—	—	—	—	—	—	—	—	—	—
" to Belfast, .	—	—	—	—	—	—	—	—	—	—	—
" to Spike Island, .	—	—	—	—	—	—	—	—	—	—	—
" to Queenstown, .	—	—	—	—	—	—	—	—	—	—	—
" to Waterford, .	—	—	—	—	—	—	—	—	—	—	—
Total, .	—	—	—	—	—	—	—	—	—	—	—
Aghada Pier to Cork, .	—	—	—	—	—	—	—	—	—	—	—
Belfast " .	—	—	—	—	—	—	—	—	—	—	—
Spike Island " .	—	—	—	—	—	—	—	—	—	—	—
Queenstown " .	—	—	—	—	—	—	—	—	—	—	—
Waterford " .	—	1	—	—	1	—	—	—	—	—	—
Total, .	—	1	—	—	1	—	—	—	—	—	—
Waterford to Ballyhack, .	—	—	—	—	—	—	—	—	—	—	—
" to Belfast, .	—	52	—	8	60	6	3	9	4	—	4
" to Duncannon .	—	—	—	—	—	—	—	—	—	—	—
Total, .	—	52	—	8	60	6	3	9	4	—	4
Ballyhack to Waterford, .	45	35	—	—	80	—	—	—	16	—	16
Dublin to Belfast, .	353	—	—	—	353	508	3	511	—	—	—
Duncannon to Waterford, .	90	5	—	—	95	1	—	1	95	—	95
Kilrush to Limerick, .	—	—	—	—	—	—	—	—	406	—	406
Kildysart " .	—	—	—	—	—	—	—	—	—	—	—
Glin, " .	—	—	—	—	—	—	—	—	10	—	10
Portumna, " .	—	—	—	—	—	—	—	—	—	—	—
Tarbert, " .	—	—	—	—	—	—	—	—	25	—	25
Kilkee, " .	—	—	—	—	—	—	—	—	—	—	—
Total, .	—	—	—	—	—	—	—	—	441	—	441
Milford to Portrush, .	—	—	—	—	—	—	—	—	—	3	3
Belfast to Dublin, .	—	—	—	10	10	34	—	34	—	—	—
Londonderry to Moville, .	—	—	—	—	—	—	—	—	—	—	—
Moville to Londonderry, .	—	—	—	—	—	—	—	—	—	—	—
Ballina to Sligo, .	—	—	—	—	—	—	—	—	—	—	—
Belmullet " .	40	1	5	—	46	—	—	—	516	—	516
Westport " .	—	—	—	—	—	—	—	—	—	—	—
Total, .	40	1	5	—	46	—	—	—	516	—	516
Sligo to Belmullet, .	—	—	—	—	—	—	—	—	—	—	—
Milford to Mulroy, .	—	38	—	—	38	—	—	—	7	—	7
Mulroy to Milford, .	—	2	—	—	2	—	—	—	—	—	—
Belfast to Waterford, .	—	—	—	—	—	—	—	—	—	—	—
Leitbeg to Mulroy, .	—	4	—	—	4	—	—	—	—	2	2
Total, .	528	138	5	18	689	549	6	555	1,079	5	1,084

INLAND NAVIGATION.

Ireland during the Three Months ended 31st MARCH, 1914, showing and Debarcation.

Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	IRISH PORTS.
	Stallions.	Mares.	Geldings.	Total.				
—	—	—	—	—	—	—	—	Cork to Aghada Pier.
—	—	—	—	—	—	—	—	to Belfast.
—	—	—	—	—	—	—	—	to Spike Island.
—	—	3	2	5	—	1	6	to Queenstown.
—	—	—	—	—	—	—	—	to Waterford.
—	—	3	2	5	—	1	6	Total.
—	—	—	—	—	—	—	—	Aghada Pier to Cork.
—	—	—	—	—	—	—	—	Belfast "
—	—	—	—	—	—	—	—	Spike Island "
—	—	—	—	—	—	—	1	Queenstown "
—	—	—	—	—	—	—	—	Waterford "
—	—	—	—	—	—	—	1	Total.
—	—	—	—	—	—	—	—	Waterford to Ballyhack.
—	—	7	2	9	—	—	12	to Belfast.
—	—	—	—	—	—	3	73	to Duncannon.
—	—	7	2	9	—	3	85	Total.
—	—	—	—	—	—	—	96	Ballyhack to Waterford.
—	—	—	1	1	—	—	865	Dublin to Belfast.
—	—	—	—	—	—	—	191	Duncannon to Waterford.
—	—	—	—	—	—	—	406	Kilrush to Limerick.
—	—	—	—	—	—	—	—	Kiddysart "
—	—	—	—	—	—	—	10	Glin "
—	—	—	—	—	—	—	—	Portumna "
—	—	—	—	—	—	—	25	Tarbert "
—	—	—	—	—	—	—	—	Kilkee "
—	—	—	—	—	—	—	441	Total.
—	—	—	—	—	—	—	3	Milford to Portrush.
—	—	—	2	2	—	—	46	Belfast to Dublin.
—	—	—	—	—	—	—	—	Londonderry to Moville.
—	—	—	—	—	—	—	—	Moville to Londonderry.
—	—	—	—	—	—	—	—	Ballina to Sligo.
—	—	—	—	—	—	—	562	Belmullet "
—	—	—	—	—	—	—	—	Westport "
—	—	—	—	—	—	—	562	Total.
—	—	—	—	—	—	—	—	Sligo to Belmullet.
—	—	—	—	—	—	—	45	Milford to Mulroy.
—	—	—	—	—	—	—	2	Mulroy to Milford.
—	—	—	—	—	—	—	—	Belfast to Waterford.
—	—	—	—	—	—	—	6	Leitbeg to Mulroy.
—	—	10	7	17	—	4	2,349	Total

RETURN of the NUMBER of HORSES EXPORTED from IRELAND through GREAT BRITAIN to the COLONIES and FOREIGN COUNTRIES during the THREE MONTHS ended 31ST MARCH, 1914, showing the Ports of Embarkation in Ireland.

PORTS.	Number of Horses.			
	Stallions.	Mares.	Geldings.	Total.
Belfast,	—	140	142	282
Cork,	—	—	—	—
Dublin,	1	43	29	73
Dundalk,	—	145	74	219
Greenore,	—	693	389	1,085
Waterford,	—	106	169	275
Wexford,	—	—	—	—
Total,	1	1,130	803	1,934

RETURN of the NUMBER of HORSES IMPORTED into IRELAND through GREAT BRITAIN from the COLONIES and FOREIGN COUNTRIES during the THREE MONTHS ended 31ST MARCH, 1914, showing the Ports of Debarcation in Ireland.

PORTS.	Number of Horses.			
	Stallions.	Mares.	Geldings.	Total.
Belfast,	—	—	—	—
Dublin,	—	7	1	8
Wexford,	—	—	—	—
Total,	—	7	1	8

RETURN of the NUMBER of HORSES EXPORTED from IRELAND direct to FOREIGN COUNTRIES during the THREE MONTHS ended 31ST MARCH, 1914, showing the Ports of Embarkation in Ireland.

PORTS.	Number of Horses.			
	Stallions.	Mares.	Geldings.	Total.
Cork,	—	—	—	—
Limerick,	—	—	—	—
Total,	—	—	—	—

DISEASES OF ANIMALS IN IRELAND.

NUMBER OF OUTBREAKS of SWINE FEVER, and NUMBER of SWINE returned as having been SLAUGHTERED in Ireland, under the Diseases of Animals Act of 1894, in the undermentioned period, by Order of the Department.

Quarter ended	SWINE FEVER.	
	Outbreaks confirmed.	Swine Slaughtered as Diseased or as having been Exposed to Infection.
31st March, 1914,	80	344

NUMBER of OUTBREAKS reported as having taken place, and NUMBER of ANIMALS returned as having been Attacked by ANTHRAX, GLANDERS and FOOT AND MOUTH DISEASE in Ireland in the undermentioned period.

Quarter ended	ANTHRAX.		GLANDERS (including Farcy).		Foot and Mouth Disease.	
	Outbreaks Reported	Animals Attacked	Outbreaks Reported.	Animals Attacked.	Outbreaks Reported.	Animals Attacked.
31st March, 1914,	—	—	—	—	54	527

NUMBER of CASES of RABIES in DOGS in IRELAND during the undermentioned period.

Quarter ended	Number of Cases.
31st March, 1914,	—

NUMBER of OUTBREAKS reported as having taken place, and NUMBER of ANIMALS returned as having been attacked by SHEEP-SCAB and PARASITIC-MANGE in Ireland in the undermentioned period.

Quarter ended	SHEEP-SCAB.		PARASITIC-MANGE.	
	Outbreaks Reported.	Sheep Attacked.	Outbreaks Reported.	Animals Attacked.
31st March, 1914,	272	2,401	35	65

Veterinary Branch,
Department of Agriculture and Technical Instruction
for Ireland, Dublin.

ACCOUNT showing the QUANTITIES of certain kinds of AGRICULTURAL
into Ireland during each WEEK

ARTICLES	WEEK ENDED				
	3rd January	10th January	17th January	24th January	31st January
ANIMALS LIVING—					
Horses, No.	—	—	—	—	—
FRESH MEAT—					
Beef (including refrigerated and frozen), . . . cwt.	—	—	—	—	—
Mutton, "	—	—	—	—	—
Pork, "	—	—	—	—	—
Unenumerated, . . . "	—	—	—	—	—
SALTED OR PRESERVED MEAT—					
Bacon, cwt.	82	50	24	67	77
Beef, "	—	—	—	—	—
Hams, "	—	—	—	—	—
Pork, "	—	—	—	—	—
Meat, unenumerated, Salted . . . "	—	—	—	—	—
Meat, preserved otherwise than by salting (including tinned and canned), . . . cwt.	51	—	—	—	—
DAIRY PRODUCE AND SUBSTITUTES—					
Butter, cwt.	—	—	—	—	—
Margarine, "	80	96	153	250	211
Cheese, "	—	—	—	220	—
Milk, Condensed, . . . "	50	126	19	77	81
" Cream, "	—	—	—	—	—
" Preserved, other kinds . . . "	—	—	—	—	—
Eggs, gt. hunds.	—	1,164	576	240	360
LARD, cwt.	—	—	12	163	—
CORN, GRAIN, MEAL AND FLOUR—					
Wheat, cwt.	190,700	18,200	116,800	167,900	33,200
Wheat, Meal and Flour, . . . "	500	33,200	22,100	85,900	56,200
Barley, "	—	—	16,000	48,900	—
Oats, "	—	—	—	—	—
Peas, "	—	20	—	—	—
Beans, "	180	180	—	—	—
Maize, or Indian Corn, . . . "	—	101,600	455,900	247,900	82,000
FRUIT, RAW—					
Apples, "	—	—	—	—	—
Currants, "	—	—	—	—	—
Gooseberries, "	—	—	—	—	—
Pears, "	—	—	—	—	—
Plums, "	—	—	—	—	—
Grapes, "	—	—	—	—	—
Lemons, "	—	—	—	—	—
Oranges, "	—	—	—	—	—
Strawberries, "	—	—	—	—	—
Unenumerated, "	—	—	—	—	—
HAY, tons,	—	—	—	—	—
STRAW, "	—	—	—	—	—
MOSS LITTER, "	53	30	30	60	30
HOPS, cwt.	—	—	—	—	—
VEGETABLES, RAW—					
Onions, bushels,	1,740	510	—	900	—
Potatoes, cwt.	—	—	—	—	—
Tomatoes, "	—	—	—	—	—
Unenumerated, . . . value £	27	2	—	22	—
VEGETABLES, DRIED, Preserved by Canning, . . . cwt.	—	—	—	100	—
" "	—	44	24	—	—
POULTRY AND GAME, . . value £	—	—	—	—	—

*This Table is confined to the Imports of certain kinds of Agricultural Produce into a request from this Department kindly consented to separate the Irish Imports (direct) form of Weekly Returns

EMIGRATION FROM IRELAND.

TABLE showing, by Destinations, the Numbers of Emigrants (Natives of Ireland) who left the Ports of Ireland during the months of January February and March, 1914, and the total for the Three Months ended the 31st March, 1914, together with the total Number of Emigrants in each of the corresponding periods of the year 1913.

DESTINATION.	January, 1914.	February, 1914.	March, 1914.	Three Months ended 31st March, 1914.
FOREIGN COUNTRIES AND THE COLONIES :—				
America (U.S.), . . .	264	426	898	1,588
Canada,	63	104	318	485
South Africa, . . .	10	12	11	33
Australia,	57	69	69	195
New Zealand, . . .	11	6	15	32
Other Countries, . .	2	5	—	7
Total,	407	622	1,311	2,340
GREAT BRITAIN :—				
England and Wales, .	80	98	90	268
Scotland,	10	14	25	49
Total,	90	112	115	317
General Total, 1914,	497	734	1,426	2,657
General Total, 1913,	607	836	2,228	3,721

The figures in the above Table have been abstracted from the monthly Returns published by the Registrar-General for Ireland.

The figures are subject to revision in the Annual Report.

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No. 4.

DEPARTMENT OF AGRICULTURE
AND
TECHNICAL INSTRUCTION FOR IRELAND.

JOURNAL.

Meeting of the Council of Agriculture—The Vice-President's Address—
Agricultural Credit in Ireland—Technical Training of Workers in
France and Germany—Technical Education and the Irish Woollen
Trade—Summer Courses for Teachers—Celery Leaf Spot Disease
—Problem of Small Industries—Fruit Crop Report—Crop Report—
Potato Blight—Most Profitable Calving Time—Telephones for Farmers
—The Civic Exhibition—Technical Instruction for Smallholders—
Second Irish Egg-Laying Competition—Swine Fever—Official Documents
—Notes and Memoranda—Statistical Tables.

FOURTEENTH YEAR

No. 4

JULY, 1914.



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1914.

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NOTICE.

Communications respecting the literary contents of this JOURNAL should be addressed to the Superintendent of the Statistics and Intelligence Branch, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion-street, Dublin.

Communications respecting advertisements should be addressed to ALEX. THOM & CO. (LIMITED), MIDDLE ABBEY-STREET, DUBLIN ; or to LAUGHTON & CO. (LIMITED), 3 WELLINGTON-STREET, STRAND, LONDON, W.C., and not to the DEPARTMENT OF AGRICULTURE AND TECHNICAL INSTRUCTION FOR IRELAND.

COUNCIL OF AGRICULTURE.

The Twenty-fifth Meeting of the Council of Agriculture took place on Thursday, 4th June, 1914, at the Albert Agricultural College, Glasnevin, Co. Dublin.

The Chair was taken at 10 a.m. by the Right Hon. T. W. Russell, P.C., M.P., Vice-President of the Department.

The following were present :—

Representing the Department :—The Vice-President ; Mr. T. P. Gill, Secretary ; Mr. J. R. Campbell, Assistant Secretary in respect of Agriculture ; Mr. George Fletcher, Assistant Secretary in respect of Technical Instruction ; Mr. J. S. Gordon, Deputy Assistant Secretary in respect of Agriculture and Chief Agricultural Inspector ; Mr. J. D. Daly, Chief Clerk ; Mr. T. Butler, Superintendent of the Statistics and Intelligence Branch ; Mr. J. P. Walsh, Clerk in charge of Accounts ; Mr. H. G. Smith, Senior Staff Officer ; Mr. J. V. Coyle, and Mr. M. Deegan.

MEMBERS OF COUNCIL ACCORDING TO PROVINCES.

LEINSTER.

John Bolger, J.P. ; Algernon T. F. Briscoe, J.P. ; John Butler, J.P. ; Patrick J. Carey, J.P. ; Joseph Dolan ; James G. Dooley ; Robert Downes ; Colonel Sir Nugent T. Everard, Bart., D.M.L. ; James P. Farrell, M.P. ; Peter Ffrench, J.P., M.P. ; William Field, M.P. ; Patrick Hanlon ; Michael J. Horan, J.P. ; Patrick J. Kennedy, J.P. ; Captain John E. B. Loftus, J.P. ; The Right Hon. Viscount Massereene and Ferrard, D.S.O., J.P. ; Matthew J. Minch, J.P. ; Joseph Mooney, J.P. ; Patrick J. O'Neill, J.P. ; Charles H. Peacocke, J.P. ; Henry Reynolds ; William R. Ronaldson, J.P. ; James Ross, J.P. ; Hugh Wallace.

ULSTER.

Right Hon. Thomas Andrews, P.C., D.L. ; William Bailie ; R. N. Boyd ; Frederick C. Cowdy ; Patrick Crumley, J.P., M.P. ; Joseph Davison ; Edward Gallagher, J.P. ; John Keenan, J.P. ; John S. F. M'Cance, J.P. ; Thomas A. M'Clure, J.P. ; T. P. M'Kenna, J.P. ; H. de F. Montgomery, J.P., D.L. ; George Murnaghan, J.P. ; John Porter Porter, J.P., D.L. ; Colonel R. G. Sharman-Crawford, J.P., D.L., M.P. ; Michael Sheils, J.P. ; Thomas Toal, J.P. ; Rev. Lorean Ua Ciarain, P.P.

MUNSTER.

Michael Ahern ; John Bourke ; Edmund Cummins, J.P. ; Thomas Duggan, J.P. ; Joseph Dwyer, J.P. ; William R. Gubbins, J.P. ; William Henry M'Cowen ; Michael Mescal, J.P. ; Patrick Moclair ; Michael J. Nolan, J.P. ; Edmond Nugent, J.P. ; Stephen O'Mara ; Thomas Power ; Hugh P. Ryan ; Michael Slattery, J.P.

CONNACHT.

Patrick D. Conroy, J.P. ; P. J. Costello, J.P. ; Rev. Joseph G. Digges, M.A. ; Rev. Charles Flynn, P.P., V.F. ; John Galvin ; James P. MacGuire, J.P. ; Daniel Morrin, J.P. ; Rev. Philip J. Mulligan, P.P. ; Robert P. Wallace, J.P.

Mr. H. G. Smith acted as Secretary to the Meeting.

The minutes of the Twenty-fourth Meeting (28th November, 1913), a copy of which had been sent to each member of the Council, were taken as read, and were signed as correct.

Apologies for inability to attend the meeting were received from The Right Hon. Lord Monteagle, K.P., D.L. ; Mr. Hugh T. Barric, M.P. ; Mr. George F. Murphy, J.P. ; Captain John Patrick, J.P. ; Rev. P. J. Manly, C.C. ; Mr. W. McM. Kavanagh, D.L. ; and Mr. D. L. O'Gorman, J.P.

The Vice-President delivered his address (see pp. 626 *et seq.*).

Mr. James P. Farrell, M.P. (Co. Longford), inquired as to why no action had been taken by the Department in regard to the resolution adopted at the last meeting of the Council with reference to the position of members of County Committees as affected by the Application of Enactments Order of the Local Government Act, 1898.

The Vice-President explained that the Department were of opinion that the principle underlying the Order, was, on the whole, a desirable one. They did not, therefore, propose to take any action in the matter.

Colonel R. G. Sharman-Crawford, D.L., M.P. (Co. Down), asked whether, in the case of persons who rendered themselves liable to prosecution for concealment of foot-and-mouth disease, proceedings had been or would be taken by the Department.

The Vice-President stated that this matter had been carefully considered by the Department in consultation with the Law Officers of the Crown. In one case a farmer had been prosecuted for concealment and had been fined £15 and costs at Douglas Petty Sessions. A much more serious case had occurred near Glanworth, which would be tried during the present month. In this case the Department were sending down their own Counsel to prosecute. While the Department did not wish it to be understood that there was any general concealment of the disease (such general concealment, would, in fact, not be possible), they were bound to take steps to make clear that any attempt at concealment would not be tolerated by the Department.

Mr. James P. Farrell, M.P. (Co. Longford), asked whether there was any prospect of an agreement between the officers of the Department and of the Board of Agriculture and Fisheries upon the question of the outbreak of foot-and-mouth disease at Birkenhead.

The Vice-President stated that he had no further information upon the subject than that contained in the full official report which had already been published. In his address to the Council that day he had made clear his views upon the findings.

In reply to a question by Mr. Hugh Wallace (Dublin), the Vice-President stated that the various local authorities in England had power to exclude Irish cattle from the areas administered by them, independent of any action of the English Board of Agriculture. That Board could, however, revoke the powers given to these local authorities in this matter, but such a course of action would naturally involve many difficulties.

Mr. James P. Farrell, M.P. (Co. Longford), brought forward the following resolution standing on the Agenda paper in his name :—

“That, believing that the continued development of foot-and-mouth disease in Ireland is due to defective sanitation of the port of Birkenhead, and to the failure of the English Department to provide for full disinfection and the prevention of the introduction of disease into Ireland from that port, we call on the Prime Minister to give facilities for the holding of a thorough inquiry by either a Committee of the House of Commons or an impartial judicial tribunal into the whole question.”

In order to facilitate discussion, the Council agreed to consider at the same time two other resolutions upon the Agenda paper which also dealt with the question of foot-and-mouth disease. These resolutions were as follows :—

“That it would be advisable to appoint a representative Consultative Committee to confer with and assist the veterinary officials in carrying out the regulations to be enforced under the Cattle Diseases Acts,”

proposed by Mr. William Field, M.P. ; and

“That in the opinion of this Council the measures taken by the Department for the suppression of foot-and-mouth disease are necessary and trustworthy, and in the past have been singularly effective ; and that considering our dependence on British markets for the thorough development of the cattle trade nothing can be more detrimental to the live stock industry than any want of co-operation with those measures

on the part of farmers and others engaged in the industry, or any attempt at concealment of the foot-and-mouth disease,"

proposed by Mr. Robert Downes (Co. Westmeath), in the absence of Rev. P. J. Manly, c.c. (Co. Leitrim).

Mr. Farrell's resolution was seconded by Mr. Patrick Crumley, J.P., M.P. (Co. Fermanagh), and was discussed at considerable length. Eventually Mr. Farrell, by leave of the Council, withdrew the motion, in favour of a resolution in the following terms which was moved by him and seconded by Mr. P. Crumley :—

"That believing that the recent outbreaks of foot-and-mouth disease in Ireland were due to infection coming from England—arising among other causes from defective sanitation of the port of Birkenhead; and having regard to the immense loss and hardships inflicted upon the Irish live stock industry through these means, we call upon the Government to give facilities for a thorough inquiry into the whole question of the recent origination of this disease."

This resolution was passed unanimously.

Mr. P. Kennedy, J.P. (Co. Meath) moved to add to the resolution as adopted the following words: "and into the general working of the Diseases of Animals Acts as between Great Britain and Ireland." This proposal was seconded by Mr. T. P. M'Kenna, J.P. (Co. Cavan). After some discussion the question was put. On a division there voted :—

For the addition to the resolution	..	25
Against	.. .. .	38
		—
Majority against	..	13

The voting was as follows :—

FOR.

Leinster.—James G. Dooley; Colonel Sir Nugent T. Everard, Bart., H.M.L.; James P. Farrell, M.P.; Peter Ffrench, J.P., M.P.; William Field, M.P.; Patrick Hanlon; Patrick J. Kennedy, J.P.; Captain John E. B. Loftus, J.P.; Charles H. Peacocke, J.P.; Henry Reynolds; James Ross, J.P. *Ulster*.—William Bailie; R. N. Boyd; Patrick Crumley, J.P., M.P.; Thomas A. M'Clure, J.P.; T. P. M'Kenna, J.P.; H. de F. Montgomery, J.P., D.L.; Rev. Lorcan Ua Ciarain, P.P. *Munster*.—Joseph Dwyer, J.P.; Michael Mescal, J.P.; Michael J. Nolan, J.P.; Stephen O'Mara. *Connacht*.—Rev. Charles Flynn, P.P., V.P.; Daniel Morrin, J.P.; Robert P. Wallace, J.P.—25.

AGAINST.

Leinster.—John Bolger, J.P. ; Algernon T. F. Briscoe, J.P. ; John Butler, J.P. ; Joseph Dolan ; Robert Downes ; The Right Hon. Viscount Massereene and Ferrard, D.S.O., J.P. ; Matthew J. Minch, J.P. ; Joseph Mooney, J.P. ; Patrick J. O'Neill, J.P. ; William R. Ronaldson, J.P. ; Hugh Wallace. *Ulster*.—Right Hon. Thomas Andrews, P.C., D.L. ; Frederick C. Cowdy ; Joseph Davison ; John Keenan, J.P. ; John S. F. M'Cance, J.P. ; George Murnaghan, J.P. ; John Porter Porter, J.P., D.L. ; Colonel R. G. Sharman-Crawford, J.P., D.L., M.P. ; Michael Sheils, J.P. ; Thomas Toal, J.P. *Munster*.—Michael Ahern ; John Bourke ; Edmund Cummins, J.P. ; Thomas Duggan, J.P. ; William R. Gubbins, J.P. ; William Henry M'Cowen ; Patrick Moclair ; Edmund Nugent, J.P. ; Thomas Power ; Hugh P. Ryan ; Michael Slattery, J.P. *Connacht*.—Patrick D. Conroy, J.P. ; P. J. Costello, J.P. ; Rev. Joseph G. Digges, M.A. ; John Galvin ; James P. MacGuire, J.P. ; Rev. Philip J. Mulligan, P.P.—38.

Mr. M. J. Horan, J.P. (Leinster), did not vote.

Mr. William Field, M.P., asked leave to withdraw the resolution standing in his name (*see* p. 621).

The resolution was accordingly by leave withdrawn.

The resolution standing in the name of Rev. P. J. Manly, c.c. (Co. Leitrim) (*see* p. 622), was moved by Mr. Robert Downes (Co. Westmeath), and seconded by Captain John E. B. Loftus, J.P.

On being put to the Council the resolution was declared carried.

The following resolution was proposed by Mr. Patrick Hanlon (Co. Carlow), and seconded by Mr. John Keenan, J.P. (Co. Londonderry) :—

“That we advise that another inspection of mares and stallions under the Irish Draught Horse Scheme be made, so as to get all the best specimens possible of the breed. Many of those selected have met with mishaps, and those foaled or too young at the time of inspection might now fill their places.”

The Assistant Secretary in respect of Agriculture gave information as to the progress and present position of the scheme. In his opinion it would not be judicious to incur further expenditure in the direction proposed by the resolution until the experiment had been tested for a few more years.

The resolution on being put to the Council was declared lost.

Mr. Michael Sheils, J.P. (Co. Down), moved the following resolution :—

“That this Council believe it advisable to take action on the question of improving the relations between farmers and their labourers.”

After some discussion, the further consideration of the question was postponed, and the resolution was accordingly, by leave, withdrawn.

The following resolution standing in the name of Mr. D. J. Cogan (Co. Wicklow), was not moved owing to the absence of Mr. Cogan :—

“That a special premium of £5 be given to the best three years’ old mare, the property of a farmer, shown in each of the mare shows held in each county, provided that she is by a thoroughbred sire and is likely to breed weight-carrying hunters or high-class harness horses, and that she is put to a thoroughbred registered sire ; such premium not to be paid until the following spring, when she produces a foal. She is to be entitled to a similar premium for the following year, subject to the same conditions, preference to be given to farmers whose valuation does not exceed £50. Should no three years’ old mares be shown at any show, then to the best four years old mare.”

The following resolution was proposed by Mr. R. N. Boyd (Co. Antrim) :—

“That the Department of Agriculture should confer with the Market Committee of the London Corporation with a view to arrange a satisfactory method of selling dead meat forwarded to the Central Meat Markets, Smithfield, from Ireland.”

Mr. Boyd explained that, being offered £15 a head for a lot of cattle, he had sent some carcasses to the London market. The salesman, instead of selling the meat and returning the price obtained, had it valued at 3s. a stone, and had retailed it for his own advantage without keeping an entry of the persons to whom he had sold it. He (Mr. Boyd), had taken the matter up with the London Markets Committee, but failed to obtain effective redress. He then issued a summons in the London County Court for £15 10s. the price of the meat valued at 4s. a stone. The salesman rather than allow the matter to come into Court had lodged the full amount in Court with costs. The facts had been placed before the London Markets Committee, who had also been informed that the subject was being brought under the notice of the Council of Agriculture.

During the discussion upon Mr. Boyd’s resolution, Mr. C. H.

Peacocke, J.P. (Co. Wexford), handed in a letter from Mr. T. L. Esmonde, Manager of the Wexford Dead Meat Industry, in which the writer stated that he had five years experience of the unsatisfactory conditions existing in connection with the sale of Irish dressed meat in the Smithfield Market, and made various suggestions as to action which the Department might take in the matter, especially as regards railway rates.

The Vice-President on behalf of the Department accepted the resolution proposed by Mr. Boyd, and promised that the whole question, which was one of considerable importance, would receive careful consideration.

In connection with the following motion which stood in the name of Mr. Robert Downes (Co. Westmeath):—

“To call attention to the action of the Department in refusing to hold an inquiry asked for by the Westmeath County Committee into the report of the Department’s Poultry Inspector *re* charges against the Poultry Instructress for that county.”

the Vice-President expressed his regret that as the matter referred to was one purely of Departmental administration, he was compelled to rule the motion out of order.

The following resolution was proposed by Mr. Robert Downes (Co. Westmeath), and seconded by Mr. Algernon T. F. Briscoe, J.P. (Co. Westmeath):—

“That the time has come when the powers and privileges of County Committees of Agriculture and Technical Instruction should be extended as regards the allocation and expenditure of funds.”

After some discussion the consideration of the matter was adjourned on the motion of Mr. Michael Slattery, J.P. (Co. Tipperary, S.R.), seconded by Mr. Michael Ahern (Co. Cork).

In the absence of Rev. P. J. Manly, c.c. (Co. Leitrim), the following resolutions standing in his name were not brought forward:—

(1) “To inquire as to the present position of the question of Agricultural Credit.”

(2) “To inquire what consideration has been given by the Department to the subject of Live Stock Insurance, especially as applicable to the needs of small farmers in the West of Ireland.”

The proceedings terminated at 2 p.m.

(The members of the Council were subsequently entertained by the Department at luncheon in the College, and were given the opportunity of inspecting the buildings, farm, live stock, etc.)

THE VICE-PRESIDENT'S ADDRESS.

MY LORDS AND GENTLEMEN,

The Council meet to-day in new surroundings. The Department have thought it expedient to fix the Royal Albert Agricultural College as the place of meeting on the present this occasion in order that the members of the Council may have an opportunity of inspecting this, our principal centre of agricultural education. I should be glad, indeed, if the Council could meet periodically at some of the larger institutions connected with the Department, as this would, in addition to giving the members a direct knowledge of the educational work that is going forward, doubtless increase the interest of the public in these institutions, and thereby greatly widen and enhance their influence. Many considerations have, however, to be taken into account in convening a large and representative body such as the Council, and a change of venue is possible only under special conditions and at infrequent intervals. In view of our special programme to-day, it will be necessary to keep the proceedings at this meeting within the most concise limits, and, applying this necessity in my own case, I propose in my opening remarks to touch as briefly as I can upon only a few matters in regard to which it is essential that the Council and the country should be fully informed.

FOOT-AND-MOUTH DISEASE.

The first subject to which I shall refer is the recrudescence of foot-and-mouth disease in Ireland early this year. The reappearance of the disease in this country was preceded, as on former occasions, by outbreaks in Great Britain. There were outbreaks in Sussex and Hertfordshire last November and December, which were wholly and admittedly unconnected with Ireland. Having regard to the course that events have taken, it is of prime importance that this fact should be noted and officially emphasized. Ireland was free from the disease at the time of these outbreaks, and continued so for more than a month subsequently.

THE COUNTY KILDARE OUTBREAK.

On 30th January, however, the Veterinary Inspector of the Local Authority for County Kildare reported certain cattle at Naas to be affected. Another local Veterinary Surgeon, the officer of the Rural District Council, had had these animals under treatment for some days previously, but had not at first suspected the presence of foot-and-mouth disease. When his suspicions were

aroused he communicated with the Veterinary Inspector of the Local Authority, who at once notified the Department. There was, therefore, no concealment. The Chief Inspector of the Veterinary Branch examined the cattle the same night and confirmed the existence of the disease. A district of fifteen miles around the infected place was immediately placed under restrictions, the officers of the Department at all the Irish ports received telegraphic instructions to suspend the inspection of animals for shipment, and the inspectors of the Board of Agriculture and Fisheries at the various British landing places were apprised of the outbreak so that they might take such steps as their instructions would warrant in the circumstances. Some two days later a further case was reported, this time in County Kildare, at Ballysax, about nine miles from Naas, on premises where the disease had paid a previous visit in 1912. The limits of the scheduled district were thereupon extended to fifteen miles from this new centre. Every precaution that experience could suggest was promptly applied to guard against the spread of infection. Inquiries as to the movement of stock from the district prior to the outbreaks were set on foot, so that such animals as had been moved might be placed under observation; and where movement to Great Britain was found to have occurred, the English Board were apprised of the fact. The measures taken were successful in arresting the spread of the disease in County Kildare. Shipments from Ireland had been totally suspended for only one day, and, apart from the additional short period of complete embargo on the port of Dublin, the export of stock for slaughter at British landing places was carried on from all the Irish ports.

INFECTION OF IRISH LIVE STOCK AT BIRKENHEAD.

The situation appeared promising, but, unfortunately, any hopes that the trouble would be of short duration were doomed to disappointment. On 13th February the news was received that foot-and-mouth disease had appeared among live stock from Ireland at the Birkenhead landing place, and that all further shipments were prohibited. Suspicious symptoms were first observed at Birkenhead on 12th February among swine landed from Waterford on 8th February. Further cases were found on the following morning among cattle that had arrived from Newry on 10th February. The slaughter of the animals in the landing place was not completed until 18th February, and before that time the disease had developed among animals belonging to fourteen different cargoes arriving from seven different Irish ports. The total number of animals found to be affected was 175 cattle and 57 swine.

THE HISTORY OF THE ANIMALS AFFECTED.

Immediately on receipt of the information as to the appearance of the disease at Birkenhead, the Department despatched one of their senior Inspectors to that place, and set about investigating the history of the animals comprised in the fourteen cargoes reported to be affected. These investigations met with a large measure of success. As regards the swine, it was only possible at first to ascertain that they had been bought at certain fairs, generally from unknown persons. In such circumstances the Department were thrown back on the necessity of making a house-to-house inspection of all animals in large areas of about ten miles radius around the places where the fairs had been held. On none of the premises visited, however, in connection with either the cattle or the swine was any symptom of foot-and-mouth disease discovered.

NO DISEASE AT IRISH PORTS.

It was noted that although the ports in Ireland from which the animals involved had been sent were simultaneously sending stock to other British ports, no cases of disease had been reported from these ports. This is a vital fact in considering the origin of the outbreak at Birkenhead, and later outbreaks in Ireland to which I shall shortly refer. Another important consideration was the fact that at two Irish ports swine belonging to lots in which disease was found at Birkenhead had remained behind unshipped and had continued free from the disease.

THE JOINT INQUIRY AT BIRKENHEAD.

In the circumstances, and bearing in mind the fact that the disease was now beginning to break out elsewhere in Great Britain, the question of whether the Birkenhead animals had contracted infection after arriving there, or before leaving Ireland, was an important one. It was decided that the matter should be the subject of a joint inquiry at Birkenhead by the chief Veterinary Officers of the Irish and English Departments, assisted by some of their colleagues. This inquiry, as is well known, did not result in a united finding. The officers of the English Board leaned towards the view that infection *might* have been introduced from Ireland—a very curious finding, and one scarcely warranted by the facts, while the officers of the Department considered that the evidence clearly showed that this could not have been the case.

DEVELOPMENTS IN COUNTY CORK.

Events marched rapidly, however, and it soon became apparent that the trouble was only in the initial stages. A few days sub-

sequent to the inquiry an outbreak occurred at Ballinacourty, near Kinsale, Co. Cork. One animal was affected, and it had come only a short time previously from a saleyard in Cork city. Other cases, principally in the neighbourhood of Cork city, but all connected with the same sale, followed each other in quick succession. The number of outbreaks in the district, within the first week in March, amounted to twenty-four. Throughout the remainder of that month, and up to 3rd April, outbreaks continued to occur. Then followed a pause of almost four weeks, and the scene shifted to a fresh locality, of which the centre was Derryvillane, near Glanworth, in the north of County Cork. There have been eight outbreaks in this district up to the present, and the total number of cases in County Cork so far has been fifty-two.

SPREAD OF THE INFECTION TO COUNTY TIPPERARY.

The spread of the disease following the sale referred to was, unhappily, not confined to Cork. It was found that calves purchased at the sale had been moved to various centres in the South of Ireland, and there sold to unknown persons. Two of the dealers in these calves resided in Thurles, Co. Tipperary, and the disease quickly broke out on their premises. There was serious reason to fear that the dispersion of these calves might cause widespread trouble, and the Department scheduled areas of fifteen miles radius around the following places, in addition to Thurles, where calves were ascertained to have been sold, viz., Birr, Roscrea, Kilmallock, Templemore, Kilkenny, New Ross, Waterford, Cappoquin and Limerick.

SELFISH AND SHORTSIGHTED ACTION OF A FEW STOCKOWNERS.

Efforts were made to track down all the calves, which, in the nature of the case, was an extremely difficult task as nearly five hundred animals had to be located. The assistance of the public was invoked through the press, and announcements were made in the churches by the Bishops and clergy, calling on the people to give the Department every information and help in their power. Notwithstanding all this, however, farmers in a few instances endeavoured to conceal the fact of their having purchased some of these calves. They doubtless felt that as the animals were not diseased any action on their part was unnecessary. Be this as it may, the result was that large areas, which otherwise might have been freed from restrictions in a very short time, had to be kept under prolonged observation.

This concealment, not of disease, but of information, led to the development of disease in places where, had it been practicable

to trace and slaughter the calves promptly, outbreaks might have been averted. The likelihood is that but for this reprehensible conduct the disease would have been completely eradicated weeks ago. It is certain that the outbreaks in the neighbourhood of Derryvillane were one and all due to the failure of the stock-owner with whom the cases originated to disclose the presence of one of the calves on his premises.

It would be impossible to estimate how greatly the country has suffered in money and in character from this lack of a sense of public obligation on the part of a few individuals, who in a selfish and shortsighted attempt to conserve what they considered to be their own interests, sacrificed those of their neighbours and of the Irish live stock industry as a whole. The disease appeared at other points in County Tipperary, but for the most part the cases, which have numbered eighteen in all—the last having occurred towards the end of April—were grouped round Thurles. The infection did not gain such a hold in this county as it did in Cork, but a very large area was involved.

FURTHER OUTBREAKS IN KILDARE AND DUBLIN.

After the district originally scheduled in connection with the Kildare outbreaks had been declared free, a further case occurred late in March on premises about a mile distant from the scene of the earlier outbreaks at Ballysax. A week later the existence of the disease was also confirmed at Ticknock, Stepside, in County Dublin. The usual measures were taken in connection with these outbreaks. There was no extension of the disease in either instance; and I am happy to say that the restrictions which it was necessary to impose have since been wholly removed.

OUTLOOK HOPEFUL AND SATISFACTORY.

It will be gathered from the brief review which I have given that the disease has appeared in four counties, viz., Kildare, Cork, Tipperary and Dublin; that it has been eradicated in Kildare and Dublin, and very probably in Tipperary; but that as regards Cork, while the original scheduled area has been for some time free from infection, the disease still appears to be present in a limited area of the northern part of the county. The general outlook, therefore, is such as to warrant the hope that it will not be long now until the entire country is relieved of this evil impediment to the main source of its agricultural prosperity. So much for the narrative of the progress of foot-and-mouth disease in Ireland.

EFFECTS ON LIVE STOCK INDUSTRY.

The traffic in live stock has, needless to state, been most seriously affected. Following the outbreak at Birkenhead and the subsequent developments in County Cork, there was a period of six weeks during which not a single head of cattle, sheep or swine was shipped from the country. For the last three years our exports of these three classes of animals have averaged over 1,700,000 head. The figures for 1912 and 1913 when taken together show an average which is practically identical with the figures for 1911. This proves that our export trade recovered in 1913 what it lost in 1912, when there were similar interruptions in our shipments of live stock. I sincerely hope that history will repeat itself in this connection, and that we shall, to a similar extent at least, cover our heavy losses. There has been a gradual reopening of the ports—Cork alone remaining closed—and as regards fat cattle the number now being exported is greater than it was at the corresponding period last year.

ACTION OF LOCAL AUTHORITIES IN GREAT BRITAIN.

Sheep and swine shipments, however, remain below the normal; and the exports of store cattle which are now on the upgrade have been exceptionally depressed. The fall in the figures for store cattle is mainly due, of course, to the Local Authorities in Great Britain adopting regulations which preclude the entry of animals from Ireland into their respective districts. By far the greater part of England and Scotland is at present barred to our store stock, not by the Board of Agriculture and Fisheries, but by British Local Authorities. This development is stated to be due to fear of the introduction of disease from this country.

REASON FOR GREATER STRINGENCY OF RESTRICTIONS IN IRELAND.

Our friends across the Channel are not always fully informed as to the extent of the precautionary measures adopted by the Department, which are necessarily more stringent than those resorted to in Great Britain. The reason for this greater stringency arises from the fact that Ireland is the exporting country, and that if foot-and-mouth disease once became epidemic amongst her huge animal population it would be fatal to her trade in live stock. The interest of Ireland in a clean bill of health is, therefore, overwhelming. Indeed our Local Authorities fully appreciate the need for a thorough policy in this matter, and have almost universally shown throughout these very trying experiences, and often under the most galling conditions, a spirit as remarkable as it is praiseworthy.

INEQUITABLE TREATMENT OF IRISH INTERESTS BY SOME BRITISH STOCKOWNERS.

Of course the action of the British Local Authorities has largely undermined and nullified the arrangements made between the Department and the English Board as regards the shipment of store stock. The situation is a grave and indeed a perplexing one, and all that I can say at the moment is that the matter is engaging the constant and earnest attention of the Department.

I feel that I must at this point refer to the somewhat inequitable treatment which has been meted out in some quarters to Irish interests in connection with what is little short of a national disaster. I do not object—nobody has any right to object—to the stockowners of Great Britain taking whatever steps they may deem to be necessary for safeguarding the health of their flocks and herds. But in such a case facts ought not to be wholly thrust out of sight. In only two of the thirty-two counties in Ireland did foot-and-mouth disease develop to any serious extent. In Dublin and Kildare there were only four cases of disease, involving two very limited areas. In these instances the disease was of the mildest type and was speedily eradicated. In the other two affected counties, viz., Cork and Tipperary, the situation was much more serious. Here the disease was virulent in the extreme, and of the same type as that which broke out at Birkenhead previous to the outbreak at Cork—another fact of some importance in considering the origin of the disease.

HAY AND STRAW AS A SOURCE OF INFECTION.

There is no evidence to support the suspicion which appears to be rather widely entertained that the disease was introduced maliciously. There is no ground for the allegation that straw imported for litter from infected countries abroad is responsible for the trouble, as both in Ireland and in Great Britain the import of hay and straw from such countries for use as fodder or litter is totally prohibited. Neither is there any reason to assume the culpability of hay and straw used for the packing of imported goods.

BIRKENHEAD AND THE CORK OUTBREAKS.

After anxiously considering all the facts, I am forced to concur in the finding of the officers of the Department who participated in the Birkenhead inquiry, viz., that the disease was not carried from Ireland to that port, and that the Irish animals which became involved in the outbreak were infected at the landing stage. It is not unlikely that the disease was conveyed by drovers or by

some such means to Cork, where it gained a foothold, and eventually paralysed the live stock industry throughout the South of Ireland. These, in my opinion, are the plain facts. From what has been written and said upon the subject, one would imagine that what I may call the disease position in Ireland is infinitely more serious, instead of being, as I have stated, at present confined to a small corner in the north of County Cork.

ALLEGATIONS AGAINST IRISH STOCKOWNERS AND THE DEPARTMENT.

As a sample of the treatment to which I refer, I take a speech delivered by the Duke of Devonshire at a meeting of the Royal Agricultural Society, reported in the *Field* of 9th May last. His Grace spoke as a resident in the South of Ireland and said :—

“ He would impress upon them the appalling gravity and severity of what had happened in Cork and Waterford. The outbreaks of foot-and-mouth disease practically meant ruin to many people there, especially to tenants who had become owners of their land. When keep was short it was necessary that stock should be realised in order that the instalments should be met, and in these cases the loss had come with exceptional severity. He had no proof, but from what he had seen and heard since he went there in January, he had no doubt that this disease had been prevalent in Ireland for a very long time. They had been thoroughly frightened now that it had assumed such proportions, and were taking strong measures indeed, but how far these strong measures would be effective it was difficult to say. He hoped that the Society would back up any steps that were taken, either by the Department of Agriculture here, or in Ireland, to stamp out the disease. It was no use ignoring the fact that there had been a considerable outbreak, far greater than had been notified or made known to the public press.”

That anyone at such a time should preface a charge of this character by the statement that “ he had no proof ” for the charge he was making—that anyone occupying the position which the Duke of Devonshire occupies in England should so gravely prejudice his own County of Waterford, where there has been no case of disease for thirty-two years, is surprising and regrettable in the highest degree, and I do not think that I would be justified on an occasion like this in passing over such a statement. The County of Waterford was placed under restrictions, not because of any disease within its own borders, but owing to its contiguity to Cork and Tipperary. But the remarks of the Duke of Devonshire are typical of much of what has gone on during the past three months.

I had to threaten legal proceedings against an English daily newspaper which charged the officers of the Department with being concerned in a conspiracy to foment and spread the disease. The paper in question at once apologised and withdrew its charges.

CONCEALMENT OF FOOT-AND-MOUTH DISEASE.

There is practically no possibility of concealing foot-and-mouth disease in a country with a densely crowded cattle population like Ireland. The disease has only to appear and, if unchecked, it will spread like wildfire. Any attempt to hide it would be unavailing. The idea of concealment, save perhaps in an isolated case, is absurd and futile, and all the facts point in a contrary direction. It is, I repeat, most unjust for those who confess that they have "no proof" for their statements to go on circulating these damaging charges. With twenty-eight out of thirty-two counties not even touched by the disease, with its actual disappearance from the stricken localities, save in one limited district, it is, to say the least, an unreasonable excess of caution to persist in a boycott against Irish live stock so rigid as that which prevails in Great Britain at the present time.

SHEEP SCAB.

The Council will remember that at our meeting last November I uttered a note of warning in regard to the prevalence of sheep scab in Ireland. I then stated that if we desired to keep the trade in sheep with Great Britain as open, profitable and effective as it has been up to the present, nothing should be left undone in our endeavours to suppress this disease. Scab in sheep is far more prevalent in Ireland than it is in Great Britain. The sheep population of Ireland in 1913 was 3,620,724, and the proportion of outbreaks per 100,000 was 15·3, as against a British sheep population of 23,931,412 with 1 outbreak per 100,000. Unfortunately a large number of cases of scab have been detected at the Irish ports by the Department's Inspectors, and amongst Irish sheep at the various landing places in Great Britain. Indeed cases have even occurred subsequent to the movement of the animals to their destinations in England.

OBSERVANCE AND ENFORCEMENT OF SHEEP DIPPING ORDERS.

The Department have for a long time pressed this matter upon the owners of sheep, as well as upon the County Councils and the magistrates throughout the country, who are charged with the administration of the law. But in spite of all our efforts, which have been heartily supported by the Irish Cattle Traders' and Stockowners' Association, it has been found impossible to impress many sheep owners with the absolute necessity of two effective

dippings each season, while not a few County Councils have failed to enforce the Sheep Dipping Orders altogether, and magistrates in only too many instances have considered that the ends of justice were sufficiently met by the imposition of a fine of one penny or of sixpence in cases of non-compliance with the regulations !

DIPPING OF SHEEP AT BRITISH LANDING PLACES.

All those people who have been lax or otherwise remiss in this way will be rudely awakened by an Order which the Board of Agriculture and Fisheries propose to issue very shortly. This Order will make compulsory the dipping of all Irish store sheep on their arrival in Great Britain ; and, in the event of scab being discovered amongst any sheep, will require that the in-contact sheep, and all the sheep forming part of the same cargo or otherwise in contact, shall be movable only on licence direct to a slaughter-house, or, after being once dipped in the landing place, to premises upon which they will be isolated and again dipped, unless slaughtered. Regulations of this character are, no doubt, a source of much inconvenience, and they not infrequently inflict considerable hardship on individuals. But in this matter we have had ample time to put our house in order, and if the proposed regulations serve to bring home to our stock breeders, and to everyone else who is interested in the Irish live stock industry, the fact that old things have passed away, and that we have reached an era of scientific agriculture in which rule of thumb methods are out of date, they will in the long run have a useful, a valuable, and an altogether beneficial effect.

REPORT OF AGRICULTURAL CREDIT COMMITTEE.

I come now to another matter of very great interest. The members of the Council have received during the past week a copy of the recently issued Report of the Departmental Committee on Agricultural Credit. As the Council are aware, the Department a little more than two years ago appointed this Committee to inquire into the whole system of credit available for the rural classes in Ireland—a subject which has been constantly enforced upon the attention of the Department in connection with schemes for the encouragement and improvement of agriculture. The Committee were specially instructed to consider the forms of agricultural credit most suitable to the requirements of the occupiers of land affected by the Land Acts in the western districts and throughout the country generally. The personnel of the Committee, was, I think, such as to cause considerable weight to be attached to any recommendations made by them. They have clearly given much time and attention to the many difficult problems coming within the

scope of their inquiry, and a glance at the synopsis of the Report will show that no aspect of the wide subject of rural credit seems to have escaped their notice. The Department have not, of course, yet had time to consider any of the Committee's recommendations, some of which would require legislation to carry them into effect, while others can, subject to adoption by the Department, be carried out under existing conditions. I understand that a great deal of interest has been taken in this inquiry by agricultural authorities in various Continental and other countries. The Report is, in my judgment, a valuable and permanent contribution to the study of what is perhaps one of the most pressing problems connected with the agricultural industry. Various matters arising out of the Report are sure to come up at subsequent meetings of the Council, and I, therefore, must content myself to-day with this passing reference to the subject.

ROYAL ALBERT AGRICULTURAL COLLEGE.

It may not be generally known to the members of the Council that about one-half of the lands attached to the Albert Agricultural College, where we meet to-day—the side of the farm on which the buildings stand—is held under a long lease (999 years), while the other half is leased from the Corporation of Dublin. Part of the lands held from the Corporation will revert to that body in September next, and the remainder in 1920. In view of the importance of the College as a public institution, the Corporation would doubtless have been willing to renew this lease. Civic requirements have, however, to be considered, and it is not probable that a lease could be granted for any lengthy period. The Department were consequently compelled to consider the need for safeguarding the interests of the College as regards the use of sufficient land in the future, and they have purchased the occupier's interest in an adjoining farm of about 210 statute acres, which was bought under the Land Act of 1903. All anxiety for the College on the question of land may, therefore, I am glad to say, now be dismissed.

AGRICULTURAL SEEDS.

I shall refer to only one other matter pertaining to the Agricultural Branch, viz., the work that is being done to improve the standard and quality of the agricultural seeds sold in Ireland. On several previous occasions I have explained to the Council why the Department have been slow in exercising the punitive powers which have been conferred on them by the Weeds and Agricultural Seeds (Ireland) Act, 1909. These punitive powers are novel and indeed unusual powers, and as such must be exercised

with deliberation and discrimination. The fact that the results of tests of seeds sampled under the Act have been published in only one instance is persistently adduced in quarters hostile to the Department as proof of negligence in dealing with the trade in inferior seeds. This criticism, in so far as it is genuine, is, in my opinion, based on a false conception of the means best adapted to achieve the end in view.

A POWER HELD IN RESERVE.

The power of black-listing, as it has been termed, is no doubt salutary as a weapon *in terrorem*, and it is one that can be resorted to if and when other methods fail. But the Department are convinced that its indiscriminate use would be detrimental rather than helpful, especially at the present juncture. It must be remembered that prior to the passing of the Weeds and Seeds Act it was not possible to deal in any effective way with this question, and that the neglect to secure the necessary legislation had led up to a situation which was simply deplorable, and which had to be faced when I took office.

VALUABLE WORK ALREADY ACCOMPLISHED.

The Act has been but a short time in operation, and valuable work has already been done under it ; but the effects of long continued neglect cannot be instantly removed. The policy of the Department in this, as in other branches of their work, has been to proceed as far as practicable by educational methods, and to induce the interests affected to co-operate voluntarily in bringing about the reforms sought to be achieved. The success of this policy is demonstrated by the fact that as a result of representations made by the Department the sixteen principal firms from whom directly or indirectly the great bulk of the agricultural seeds sold throughout the country is procured, have entered into a mutual agreement to abolish that part of their trade which consisted in the sale as agricultural seeds of the lower bushel-weight perennial and Italian rye grasses, *holecus* and hayseed, from which the great majority of the samples of inferior seeds tested in the Seed Testing Station of the Department were taken.

INCREASE IN NUMBER OF SAMPLES TAKEN.

The number of samples of agricultural seeds taken under the Act in 1913 was 6,246, being an increase of 3,904 or 62 per cent. over the corresponding period for the previous year. In selecting these samples—and this is an important point—preference was given, as in former years, to those seeds which it was thought would on examination prove unsatisfactory. It may, therefore, be taken

for granted that in no part of the country were inferior rye grass seeds sold last year, of which samples were not forwarded to the Seed Testing Station.

DISTINCT SIGNS OF IMPROVEMENT.

Here is what the head of the Station says in his report covering the year 1913 :—

“Judging from the samples of seeds tested at the Seed Testing Station, and from the reports of the Official Samplers, it is gratifying to be able to state that there are distinct signs of improvement in the quality of the agricultural seeds being offered for sale in Ireland, although it is practically impossible to give any accurate quantitative measure of the degree of improvement.

“Owing no doubt to the agreement arrived at with the principal grass seed cleaners at the Conference held in Belfast early in 1913, there is a marked diminution in the amount of worthless cleanings offered for sale under such names as White Hay, Brown Hay, Holcus, etc., etc., as well as in the lower bushel weights of Italian rye grasses.”

In connection with the foregoing extract it may be mentioned that at the date of the Belfast agreement some orders for the inferior articles referred to had already been accepted by the firms represented, and that these orders had to be filled.

A CONTINUED AND MARKED ADVANCE.

The present year is the first in which the Belfast agreement can have full effect. The sampling of seeds for the year is now completed. It has again been carefully and thoroughly carried out, and, so far as the reports of the samplers indicate, there has been a continued and a marked improvement in the quality of rye grass seeds, whilst it would appear that the sale as agricultural seeds of the low grade and no-grade articles specified in the resolution adopted at Belfast is now practically extinct so far as the seed trade proper is concerned. I regret to have to say, however, that a few cases have been reported to the Department in which it would seem that the resolution has not been adhered to. These cases are at present under investigation, and, in the absence of a satisfactory explanation, it may be found necessary to use to the full the powers which are available under the Act.

THE SALE OF “CLEANINGS.”

Apart from the seed trade proper, the Department have to contend with another class of people, who sell really worthless

so-called "hay seed" to farmers for sowing their land. These are retailers who purchase the cleanings of hay sheds; farmers who themselves sell the cleanings of their hay sheds, in seed markets held in the streets of country towns; and people having hay stores in towns who sell the cleanings of their stores. The only effective means of abolishing this trade lies in the spread of agricultural education, which will bring home to the husbandman the fact that material such as this is dear at any price. Education is necessarily a slow process, but I fear that as things stand it is the only way out of this difficulty. The publication of the results of tests of these "cleanings," together with the name and address of the vendor, would obviously have no effect in cases where there is no trade reputation at stake.

NEED FOR FULLER POWERS.

The question of bringing one or more of these people into Court for selling as seed materials which will not yield a crop is at present under consideration. But as far as I can judge, the only feasible course, outside of education, is for the Department to seek suitable powers from Parliament in the matter. The whole question is engaging the attention of the Department, and I can assure the Council that such steps as it may be found possible to take will be taken to cope with the existing unsatisfactory state of affairs.

LEGISLATION AND THE WORK OF THE DEPARTMENT.

I do not think it would be right for me to close these observations—all of them of a severely practical character—without a reference to the future working of this Council—a reference which I do not mean to be political, but which I regard as absolutely necessary in the special circumstances under which we meet to-day. The Department came into existence fourteen years ago. For more than seven of those years I have occupied the responsible position of Vice-President. During that period there have been from time to time healthy differences of opinion expressed at our Council meetings. But I think I may safely say that, outside of a single issue, these years have passed without any real or enduring friction, and that the work of the Council has conferred genuine benefits upon Irish agriculture. If ever a representative body existed in Ireland, the Council of Agriculture is assuredly that body. Nationalists and Unionists, Liberals and Conservatives, Protestants and Catholics, Ulstermen and Munstermen, have met together at its meetings in harmony and good fellowship.

THE SHADOW OF "PARTITION."

I do not know whether this is to be the last meeting of the Council as it is now constituted. But we cannot shut our eyes to legislative facts, and, unless something unforeseen happens, it may be that this country will shortly be called upon to run the risk of a division of its forces which nobody really desires, and which can only be tolerated in order to avoid what some people consider to be other and greater difficulties. I wish to say from this chair that, so far as the work of the Department is concerned, any partition of the country would be a great disaster. To break up the Council of Agriculture and the Agricultural Board, to weaken the work of our County Committees and of our schools and other educational agencies, would be nothing short of a calamity. As a mere matter of administration I believe that when any proposal of the kind is faced it will be found to be all but impracticable and to be hedged around by insuperable difficulties.

A CALAMITY TO BE AVOIDED.

This is not the place to argue such a question, but I am sure I voice the opinion of the Council when I say that any plan entailing the breaking up of our work, whilst it may be held by some to be a political necessity, will inflict grievous mischief upon, and bring ruin to, many public interests. I hope that such a calamity may be averted, and that we shall meet again, not as representing part of the country, but representing it in its entirety, as we have done so happily and so successfully in the past.

AGRICULTURAL CREDIT IN IRELAND.

The important part that credit plays in the industrial and commercial world is a matter of general knowledge.

The Universal In modern times an enormous development of the
use of Credit. use of credit has taken place throughout the world.

Indeed it may be truly said that the greater part of the operations of industry and commerce are carried on by means of credit, i.e., through the instrumentality of borrowed capital. Agriculture, the most ancient and still the greatest branch of productive enterprise, needs credit just as much as do the other spheres of industry; yet there is no doubt that credit is not made use of in agriculture to anything like the extent to which it is taken advantage of in other branches of production. There are several reasons for this somewhat strange economic fact. Farmers, if tenants only, are not in a position to pledge real property, but only chattel property. Again, an outstanding characteristic of the farming industry is the length of time of production, i.e., the length of time usually required before a loan can be repaid from the returns obtained by the outlay. Thus capital expended on seeds or manures cannot be reproduced until the crop is harvested, and advances obtained for the purchase of live stock and farm implements often take a year and sometimes several years before they can be repaid to the lender with interest, and yet show a profit to the borrower. Nature herself has fixed these limits and the farmer is powerless to alter them. Furthermore, the existing commercial banking system has, speaking generally, been evolved to meet the needs of the business and commercial world. There is, too, another natural disability by which agriculturists are hampered. Agricultural returns are seasonal. The great majority of farmers cannot look forward, like commercial and industrial workers, to having a continuous and tolerably regular inflow of receipts throughout the year. The farmer must wait until his crops are grown and harvested and the produce sold. Through a great part of the year he is spending, and receiving nothing in return. Then, too, there are risks peculiar to agriculture, or at least risks which do not exist to anything like the same extent in most commercial undertakings. Agricultural returns vary from season to season both in quantity and quality owing to accidents of harvest, disease, weather, etc., over which the most skilful farmer has no control. The products of agriculture therefore afford, generally speaking, a more uncertain security for loans than is furnished by the products of commercial and other industrial enterprises.

Such are some of the peculiarities of agricultural enterprise,

**The Need of
Agricultural
Credit.**

and yet the farmer's need for capital to be used in his industry is a great and growing one. A farmer now requires more working capital than he formerly did if he is to utilise to the greatest advantage the scientific instruction in the best agricultural methods now made available for him ; and he needs, too, more capital in view of the vastly keener competition from the agricultural products of other countries, due mainly to cheaper and improved facilities for rapid transport, methods of refrigeration, etc. The scarcity of agricultural labour, which is a marked feature of the existing rural economy of Ireland, and the need for purchasing improved agricultural machinery, constitute additional factors in the case. From a consideration of these reasons it will be at once evident that the providing of a cheap and easy method of obtaining capital for use in the agricultural industry is a very real and pressing need in Ireland to-day.

These important facts have in many various directions impressed themselves upon the Department in its efforts
Credit Committee to develop agriculture throughout the country
Appointed. and to assist the new peasant proprietary to make the most of their holdings. Accordingly on the 15th January, 1912, the Vice-President appointed a Committee "to inquire into the existing system of credit available for the rural classes in Ireland ; to suggest what, if any, improvements not involving financial assistance from the Exchequer should be made in the system ; and to consider especially the form of agricultural credit most suitable to the requirements of the occupiers of land affected by the Land Acts in the western districts and throughout the country generally."

The Committee consisted of the following :—

George Murnaghan, Esq., J.P. (who acted as a Member of the Irish Poor Law Commission), Chairman ;

Robert Kyle Knox, Esq., LL.D. (late Chairman of the Board of Directors of the Northern Banking Company, Limited) ;

Charles F. Bastable, Esq., M.A., LL.D. Professor of Political Economy, and Regius Professor of Laws, Dublin University ;

The Right Honble. William F. Bailey, C.B., one of the Estates Commissioners for Ireland ;

Reverend Thomas A. Finlay, M.A., Vice-President of the Irish Agricultural Organisation Society, and Professor of Economics in the National University of Ireland ;

Sir Robert Anderson, Bart., J.P. (of the firm of Messrs. Anderson and Macauley, Belfast) ;

Walter MacMorrough Kavanagh, Esq., D.L. ;

Thomas Patrick Gill, Esq., Secretary of the Department of Agriculture and Technical Instruction for Ireland.

Herbert G. Smith, Esq., M.A., LL.D., was appointed Secretary to the Committee.

The Committee have now issued their Report.* This Report, which is an exhaustive and voluminous one,

The Report considers the question of agricultural credit in
Issued. all its aspects. It gives a most interesting survey of the credit institutions and methods at present utilised by the Irish farmer, and as far as possible draws useful lessons from the experience of other countries, where such seem applicable to Irish conditions. It is evident that the Committee have spared no pains to obtain the latest official information upon the various matters referred to. The Report is signed by all the eight members, most of whom make some additions or reservations in regard to particular points.

In their detailed study of the existing recognised credit and thrift institutions in Ireland, and also of various other sources of credit which are made use of to a greater or less degree by Irish agriculturists and the rural classes generally, the Committee give an exhaustive account of the work done by these various institutions, and the extent to which they meet the financial needs of the farmers, especially of the medium and small classes. The institutions and methods thus considered were the following :—

- (1) Joint Stock Banks.
- (2) Post Office and Trustee Savings Banks.
- (3) Money lenders.
- (4) "Trust" or "credit" auctions.
- (5) Credit advanced to farmers by shopkeepers.
- (6) The Loan Fund Board system in Ireland.
- (7) The Co-operative Credit movement in Ireland.
- (8) Agricultural loans and grants administered by State Departments.
- (9) The credit needs of rural industries.
- (10) Mortgage or long-term credit.

To each of these branches of rural credit a separate and self-contained Section has been devoted in the Report.

Naturally in any examination of the subject of credit in Ireland the part played by the Joint Stock Banks of the country receives chief consideration. The Committee point out that the Joint Stock Banks

**The Joint
Stock Banks.**

* Cd. 7375—1914. To be obtained, directly or through any bookseller, from E. Ponsonby, Ltd., 116 Grafton Street, Dublin. Price 4s. 8d. and postage.

occupy a very important place in the industrial and agricultural economy of the country. This is shown by the steady increase in the business transacted and in the deposits received by these Banks, together with the large expansion of their branches. In fact as the main source of credit for the population the Joint Stock Banks hold an unchallenged position, though, owing to some of the distinctive features of the agricultural industry, these Banks do not meet the borrowing requirements of all agriculturists. Summarising their conclusions in regard to the relations of the Irish Joint Stock Banks to rural credit the Committee find that there has been in recent years a very large expansion of the joint stock banking system in Ireland, and that these banks have undoubtedly done much to adapt their methods as far as possible to the credit requirements of small farmers. The banks, however, owing to the characteristics of agricultural credit, which have been noted, to the fact that they hold most of their funds at call and cannot therefore conveniently deal in long-term loans, and also because, unlike credit societies, they must earn a profit for their share holders, and must accordingly turn over their capital as rapidly as possible—do not meet fully the needs of farmers and can hardly be said to meet at all the needs of agricultural labourers. The Committee find accordingly that Irish Joint Stock Banks, willing as they are to adapt themselves as far as possible to the requirements of small rural credit, have not been able fully to meet the needs of the agricultural industry of the country; nor do the Committee believe that there is any real prospect of such further adaptation taking place as will overcome to a material extent the many difficulties inseparable from any attempt to fit in the organisation of these commercial and banking institutions with the special requirements of small agriculturists.

It should be added that an admirable map showing the position of every banking office in Ireland, and indicating in the case of each branch whether it is permanently open or open only on fair days, etc., appears in the Report. A comprehensive chart shows also the deposits in the Joint Stock Banks, the Post Office Savings Banks and the Trustee Savings Banks for each year since the earliest available records.

Although the Post Office and Trustee Savings Banks cannot be considered as credit institutions in the strict sense of the term, yet as they play an important part in relation to rural credit in Ireland, the Committee have thought it advisable to make a study of their position in this respect. The Committee report that the very large sums now on deposit in the Post Office Savings Banks in Ireland prove that there are ample funds for the purposes

of agricultural credit if the confidence of the small depositor could be attracted. Interesting illustrations are given showing the huge sums on deposit in various small Post Offices in remote rural districts in Ireland. In addition it is evident that a grave economic injury is done to Ireland by the transfer of £15,000,000—the amount of the deposits in Post Office Savings Banks and Trustee Savings Banks in Ireland—of the savings of her population to England for investment in Government securities. The Committee believe that much of this amount could with advantage be utilised in the sphere of rural credit and in other reproductive directions. They do not recommend, however, the making of direct advances to credit societies in Ireland from savings bank funds, even if such a course were to be permitted by the authorities—an unlikely event, in their opinion. They think that the best way to turn to account reproductively a part of the large amount now on deposit in Irish savings banks would be the organisation of a sound scheme of co-operative credit. This, they believe, would lead to a gradual and beneficial transfer of a portion of the funds of the Post Office Savings Banks to credit societies, and would after a time furnish the latter with sufficient capital (when taken in conjunction with bank overdrafts) to meet all the reasonable current borrowing needs of the middle and small agricultural classes.

Much light was thrown on the very real necessity that exists for a satisfactory system of rural credit by the

Moneylenders study made by the Committee of the effects of
in Ireland. the operations of moneylenders in Ireland.

From the evidence received by the Committee it is clear that many, even of the more industrious, farmers resort to moneylenders, and that the part played by moneylenders in rural Ireland is in some districts expanding rather than contracting. Interesting figures, not hitherto published, are given showing the number, occupations, etc., of the moneylenders registered in Ireland. The Committee are satisfied that the operations of moneylenders in this country are a source of much real hardship; that there is at present an urgent need to safeguard as far as possible from the usurers' toils the new peasant proprietary created by the Land Acts; and that any legislation tending to curb their activities and to restrain their circularising propaganda would be extremely useful. But the Report holds out little hope that the operations of moneylenders can be materially diminished until a competing system of co-operative agricultural credit on terms suitable to the needs of the small borrower and attracting the confidence of industrious small farmers in need of capital has been established.

With regard to "Trust" Auctions the Committee's conclusions

"Trust " are that in certain forms, notably when the
Auctions. transaction is a purely fictitious one or when an animal is bought merely to be sold subsequently at a lower price, the trust auction system is one

of the most ruinous methods of obtaining ready money resorted to by the Irish farmer. The practice is also a risky one for the auctioneers habitually engaging in it, and is often merely money-lending carried on under the guise of ordinary auction transactions. The Committee think that no legislative attempt to abolish the trust auction system would be effective, seeing that any law could be easily evaded by collusion. The true remedy is, in their view, the establishment of a well-organised system of co-operative rural credit, which would do much to remove the temptation to resort to such injurious methods of obtaining credit as the trust auction.

A large part has been played in the past—and is still played—in the rural economy of many districts in Ireland

Shop Credit. by the credit advanced to farmers, especially of the smaller classes, by shopkeepers and merchants. This practice obtained in the past an odious notoriety under the name of "gombeenism." The Committee are, however, of opinion that the "gombeen man" has in recent years almost disappeared from all but some remote districts in Ireland. But they think that an injurious amount of shop credit still exists, although on the whole the burden is probably diminishing with the improved financial position of the tenant purchasers. They are satisfied, too, that the great majority of traders would much prefer a cash basis for their dealings with farmers, but that undoubtedly some are desirous of retaining customers in their debt so as to keep a hold upon them. They point out that evidence was given at their Inquiry showing that many necessitous farmers have often been saved from bankruptcy in bad seasons by the financial aid rendered by shopkeepers. In numerous instances, they state, traders have stood out of their money for years with little or no recompense. While, however, it is fair that these services should be recognised, a sound credit system suitable to the needs of the poorer farmers would, in the Committee's view, render such aid from shopkeepers largely unnecessary.

Any inquiry into the position of rural credit in Ireland was naturally bound to include the work of the

The Loan Fund Loan Fund Board. Moreover, the Loan Fund
Board System. Board system was specially remitted to the present Committee for report, on the suggestion

of a small Committee of Inquiry into the financial position of the Loan Fund Board of Ireland, which reported in 1912. After

careful survey of the work of this Board and of the constitution and operations of the Loan Fund Societies throughout the country, the Agricultural Credit Committee report that the whole system was originally designed with a view to aiding industrial workers, and that although it is now mainly utilised by the rural classes of Ireland its most characteristic features are quite unsuited to the requirements of agricultural credit. For instance, the maximum length of term of loan—twenty weeks—the repayment in many cases by instalments, the maximum limit of £10, and the comparatively high rates of interest, render the system unsuited to the needs of farmers. Apart from this inherent unsuitability of the system, the diminished income of the Board has of late years forced it to sell annually part of its investments; in a short time, therefore, its operations must cease from the lack of necessary funds. The Committee also find that public confidence in the loan fund system in some districts has been so completely shaken by past disastrous failures of Societies that any effort to resuscitate the system would be doomed to failure in those areas. They therefore recommend that the Loan Fund Board should be discontinued, as there would be no sufficient justification for retaining by the aid of an annual State grant—asked by that Board—a separate Board to supervise a distinct system of credit in Ireland, seeing that a co-operative credit system based on much superior principles is in operation, and could under the suggested reorganised scheme be developed considerably in the future. The Committee propose that the existing Loan Fund Societies should be gradually transformed into Credit Societies working under an Agricultural Credit Section of the Department of Agriculture.

In the extensive field of agricultural credit in Ireland one of the most important divisions is that covered by long term loans made by various State Departments, and accordingly the Committee have fully dealt with the nature and operations of advances of this nature administered by the State in Ireland, and also with the systems of free grants from State funds for various agricultural purposes. They have examined in the first place the loans and grants for agricultural purposes made by the Board of Public Works, and they report that these loan schemes are of special importance in relation to rural credit in Ireland. They express regret, however, that there is not a wider use made of the Land Loan Schemes administered by the Board. They attribute the limited use of the system mainly to the inelastic nature of the regulations attached to the loans. Under the regulations no loan for less than £100 can be granted under the Land Improvement Acts (save in the case of farm buildings when

**State Loans
and Grants :**
**(a) Board of
Works' Loans.**

£50 may be granted), nor under the Land Law Act for a less sum than £35. They point out also that a tenant purchaser of a holding of less than £7 Poor Law Valuation is outside the scope of the Scheme, while a tenant whose judicial rent or valuation is under £12 is similarly excluded. Thus very large numbers of Irish farmers are ineligible to obtain these useful loans. The reluctance of many farmers to increase unduly the burden upon their holdings, the cost of labour and the necessity for public advertisement of a proposed loan are given as additional reasons for the limited resort to these loans. Advances for hay-barns constitute by far the greater proportion of the loans made under this system.

The Committee suggest that the present regulations (and if necessary existing legislation) should be amended so as to permit of the minimum loan being reduced to £10 or £15, and the benefits of the schemes made available for farmers below £7 in valuation. They propose also that in approved cases personal security should be accepted in lieu of a charge upon the land.

In considering the schemes of agricultural loans and grants administered by the Congested Districts Board, (b) **Congested Districts Board's Loans and Grants.** the Committee report that the functions of the Board in the sphere of credit are entirely secondary to their main functions for the purchase, improvement and re-sale of estates. The Board cannot, therefore, to more than a very limited extent supply the credit needs of the small landholders. In the year 1911-12 the total loans made amounted to £6,137 (together with £4,538 in advances repayable with land purchase annuities). The extensive system of free non-repayable grants through Parish Committees for the erection and improvement of dwellings and outoffices which was started in 1897 could, the Committee think, only be justified by the exceptional poverty of many districts, and should, in spite of undoubted benefits conferred by it, be regarded as merely a temporary expedient (as recommended by the Royal Commission on Congestion in 1908). The fact that after seventeen years the sum of about £20,000 is now set apart annually—as compared with £3,000 eleven years ago—proves that instead of diminishing this form of State aid has rapidly increased.

Difficulties connected with title to land have much militated against the working of the Board's loan scheme for dwelling house erection and improvement. The live stock loan scheme of the Board (under which 175 loans amounting to £3,417 were made in 1911-12) can meet only a small part of the need for such aid; the Committee concur in the view of the Congested Districts Board that loans of this nature could best be dealt with by local credit societies.

Reporting on the agricultural loan schemes of the Department of Agriculture, the Committee point out that since its establishment the Department has engaged on a considerable scale in the making of loans for the assistance of farmers. The sum of £107,000 had been lent up to March, 1918, and some of the schemes have largely increased in extent since that date, notably the Scheme of Loans for Agricultural Implements. The Committee note that the repayment of the advances has been on the whole very satisfactory, and make some suggestions in regard to particular schemes. In the case of few loans does the Department require a charge upon the holding or building, but relies mainly upon personal security, and the schemes which have made best progress are those in which mortgage security is not required. The fact that the Department has been engaged in administering agricultural credit schemes of various sorts makes it desirable, in the opinion of the Committee, that all its existing loan operations should be co-ordinated in a special Credit Section which would, in addition to the existing loan schemes, have the supervision of the reorganised Loan Fund system already referred to, and of the revised scheme of co-operative credit which the Committee propose, referred to below.

With reference to the expenditure of the Estates Commissioners on the improvement and stocking of holdings, the Committee think that such expenditure adequately meets the needs of those dealt with, especially in view of the care taken in selecting new holders who possess ready capital. The Committee believe, however, that the provision of capital and credit for current expenditure on stock, implements, etc., is work properly lying outside the functions of the Estates Commissioners, and which can best be done through the agency of co-operative credit societies.

Although the Committee's Inquiry has had as its main object the consideration of the credit requirements of agriculture, there is another important branch of activity in rural districts which has in many cases so intimate a connection with purely agricultural credit problems that it is difficult to separate them, and accordingly the Committee have given the matter their consideration. We refer to the various rural industries of the country, whether the industries carried on in the homes of the people—often as supplementary to their main calling of farming—or the small mills for the production of woollens, tweeds, linen goods, etc., which are in operation in many villages and give much-needed employment in the locality, especially to the women and girls.

With regard to the credit requirements of such Irish rural industries the Committee state that the making of State loans or grants to industries for other than such purposes as technical instruction and the training of workers is not a method of aid which, in their opinion, would be as a rule either desirable or feasible, save in such exceptional circumstances as those dealt with by the Congested Districts Board in necessitous districts. The Committee consider that there are ample funds on deposit in the Irish Joint Stock Banks for the development of rural industries, if means were only found of creating an industrial atmosphere and of attracting to an increased extent the confidence of the investor and of the banks. The evidence taken at the Inquiry makes it clear that there are in Ireland to-day many rural industries which through lack of adequate credit facilities are greatly limited in their scope, the demand for the product far exceeding the supply. Difficulties as to the security available are often formidable barriers in the way of obtaining advances. The Committee recommend accordingly that in exceptional cases the Department of Agriculture and Technical Instruction and the Congested Districts Board should obtain through their expert officers in any particular line of rural industry full information in regard to the competency of the business and technical management of a particular industry, the assured demand for the product, the need for additional capital, and similar details. Such information, it is suggested, would be in many cases of much assistance if furnished to a joint stock bank in enabling the latter to make with absolute safety advances to a deserving industry.

Having dealt with that branch of long-term agricultural credit which is concerned with advances made to **Mortgage Credit.** farmers by Irish State Departments (both on real and on personal security), the Committee also report upon the important question of mortgage credit generally in Ireland, and the extent, so far as ascertainable, to which the charging of the land takes place as security for money lent to farmers, whether by ordinary creditors, by joint stock banks, by money lenders, by the State, or in other ways. Their conclusions upon this subject of mortgage may be summarised as follows. While the precise facts as to the extent and effect of mortgaging of land are difficult to ascertain, and while the relative indebtedness of small as compared with medium and large farmers has been at times exaggerated, there is no doubt as to the existence of a heavy burden of mortgage indebtedness in most, if not all, countries of small holders. The Committee consider that the tendency of a peasant proprietary to incur undue indebtedness constitutes a real danger from which the new tenant

purchasers in Ireland should, as far as possible, be safeguarded. At the same time the desirability must be recognised of enabling farmers in suitable cases to obtain without undue difficulty advances upon the only security which they are in a position to offer for long-term loans, i.e., their lands. The Committee emphasise the fact that a complete system of compulsory registration of title, and the full discharge of equities, are essentials of any sound real credit system. The Irish Joint Stock Banks are for various causes reluctant to lend on mortgage security alone or for long terms. This is an inevitable consequence of the constitution and banking methods of these commercial concerns in all countries. The difficulty may be best met, in the opinion of the Committee, by the development and extension of the Agricultural Loan Schemes of the Board of Works, the Department of Agriculture, and the Congested Districts Board, combined with the agency of co-operative credit societies for the shorter term loans required. These institutions should, in the opinion of the Committee, prove sufficient in the great majority of cases for those credit requirements of the Irish farmer which are not met by the joint stock banks. In any case it is recommended that the future development of these various sources of credit should be thoroughly tested before any experiment based on Continental Land Mortgage Credit organisations be attempted in Ireland. Some useful figures are given, showing that on the whole the famous *Land-schaften* of Germany and other countries, and the *Crédit Foncier* of France, do not meet the needs of the smaller class of farmer. One of the most important contributions made by this Report to the consideration of the problems concerned with mortgaging in Ireland is the portion which gives for the first time detailed figures showing the relative extent to which the farmers of each County charge their land. The Committee estimate that the rural indebtedness of Ireland is increasing by about £1,000,000 annually, after making due allowances for the releases of mortgages on land which take place from time to time.

In an interesting paragraph the Committee express their conviction that the attention of the new holders should be concentrated rather upon making the most of their land by honest work, even with limited capital, than upon the pledging of it for the supply of funds. Advances of long-term loans of any considerable amount should, where possible, be made in annual instalments spread over a few years rather than in a single sum; habits of thrift rather than of borrowing are vital for the success of a peasant proprietary, especially in its earlier stages. The past agrarian history of Ireland and the land settlement now proceeding point, in the Committee's opinion, to the desirability of discouraging mortgage transactions.

A large—and needless to say very important—part of the
Co-operative Report is devoted to the subject of co-operative
Credit in credit, for the Committee realised early in their
Ireland. sittings that a soundly organised and super-
vised system of co-operative credit would best

supply the special needs of small farmers. The Committee state that their study of the history of the existing credit societies in Ireland proves that while much good has undoubtedly been accomplished by some of the societies when well managed locally, there have been many faults owing mainly to the carelessness of local committees, the difficulty of finding suitable secretaries, the absence of sufficient inspection, and in many cases too great a reliance upon State loans which have frequently been treated as permanent grants. Large numbers of societies have become defunct; of the 310 societies which have been registered about 176 may be considered as in operation, and of these probably 45 per cent. must be regarded as unsatisfactory. The Committee have inserted in their Report a map showing the location of the existing Credit Societies and also of the Loan Fund Societies in Ireland. Some of the stronger credit societies furnish, in their opinion, admirable illustrations of what can be accomplished both in the encouragement of thrift and the making of loans by co-operative credit under good local management.

For various reasons, and more especially in view of the difficulty of inducing medium and large farmers to undertake unlimited liability, the Committee recommend that credit societies based on shares and limited liability should also be established in Ireland. The many difficulties connected with the Friendly Societies Acts—which alone admit of unlimited liability—are also referred to.

The Report states that there are admittedly many serious obstacles to a growth of deposits in credit societies, but even allowing for these difficulties—which are dealt with *seriatim*—the total of £30,000 in deposits for all Ireland after nineteen years' working is disappointing; most of this amount is held by a very limited number of societies. The Committee have found that security is much more influential than the rate of interest in attracting depositors, and they state their opinion that in the present stage of the movement a credit society is in the soundest position when its deposits and the normal demand for loans approximately balance, a bank overdraft being also arranged for.

The Committee consider that in view of the existing convenient overdraft arrangements between societies and joint stock banks there is no need at present for the establishment of a central co-operative bank or credit institution for the purpose of utilising

the surplus deposits of societies and making advances to them, although later on such an institution might become essential. The experience of other countries reveals the risk and difficulties often connected with central banks, extremely useful as they doubtless have proved.

With regard to the question of combining trading functions and banking in a single society, the Committee, after careful consideration, are of opinion that the disadvantages distinctly outweigh the admitted advantages of such a system.

Although the loans, amounting to £25,000, advanced to credit societies by the Department of Agriculture and the Congested Districts Board have been of much assistance to societies in poor districts, there has been an undoubted tendency in too many cases to regard these loans as permanent grants. Legal action on the part of the Department has already been necessary in 29 cases, and pressure in 48 cases, out of 121 societies obtaining such loans, occasioning frequent trouble and loss to borrowers and to sureties. On the other hand, the amount written off as irrecoverable has been comparatively small, i.e., £151. The facilities for obtaining State funds at a low rate of interest have tended to discourage the thrift side of the movement. The Committee unanimously recommend that the £11,500 now outstanding in State loans be gradually withdrawn, save in very exceptional cases where the poverty or remoteness of the districts renders the reception of local deposits or the arrangement of a bank overdraft impossible.

The audit of societies' books by the I.A.O.S. has been as effective as an audit which is not carried out at the local society's office could be. The Committee recommend that in future all audits should take place locally at the offices of the societies, and that small contributions towards the cost of such audit should be made by the State, except in cases where the profits admit of the total cost being borne by the society itself. The audit should be carried out by public auditors and not directly by the State.

The Report states that the I.A.O.S. have been unable, as admitted by their representatives, to furnish as much inspection as they would desire. As a result many societies, which needed close supervision, especially in the earlier stages, have fallen into very unsatisfactory methods of business. It is further stated that the rates of interest on deposits and loans have not as a rule allowed a sufficient margin of profit.

The Committee think that, on the whole, there seems little prospect of the present system of co-operative credit developing to anything like an extent adequate to the needs of the small farmers

and labourers of Ireland. Many witnesses representing credit societies urged the need for State supervision to inspire the confidence of depositors and of the rural community generally in these societies. The part played by the State in other countries in safeguarding co-operative credit institutions is considerable; but apart from all questions of precedent, the Committee (three members dissenting) believe that much would be gained by the establishment of credit societies under the supervision of an Agricultural Credit Section of the Department of Agriculture, with the aid of an Advisory Committee on which representatives of the Co-operative movement, Joint Stock Banks and the various State Departments dealing in agricultural loans, might be invited to sit. The Report also states that the aid of the Agricultural Instructors (as in the case of similar officers on the Continent) and of the County Committees of Agriculture (as in the case of the Prussian Chambers of Agriculture) could do much for the promotion of co-operative credit and in making its benefits more widely known. The Committee consider that the scheme of State assistance suggested by them is free from the objections generally attached to State loans, and is consistent with the fullest measure of self-help and local responsibility. It is pointed out that the Department of Agriculture has for years past dealt to an increasing extent in the sphere of agricultural credit, and that these various operations might with advantage be co-ordinated in the proposed Agricultural Credit Section which would correspond to similar branches of some State Agricultural Departments in other countries. The Committee add that there would be ample scope in the rural economy of Ireland for the operations of credit societies which might prefer to remain solely under the supervision of the I.A.O.S. and of those societies formed in connection with the scheme proposed in the Report. The important duties of central supervision and inspection performed by Unions on the Continent would thus be undertaken in Ireland by the Agricultural Credit Section of the Department of Agriculture and by the I.A.O.S.

The Report has been signed by all the members of the Committee, but several of them have added notes giving their individual views on particular points in the Report.

The Chairman and Professor Bastable emphasise the fact that the principal source from which the loans required

by the members of credit societies will be supplied is—and can only be—the sums placed on deposit in those societies. They point out that experience has shown that this side of the credit societies' work in Ireland has yielded unsatisfactory results; in

many cases no deposits have been invited by societies, while in others depositors are few and the amounts small. Exceptional cases, where deposits are sufficient to meet the ordinary calls of borrowers, serve only to emphasise the general existence of a very different state of things. In spite of the amount of zeal and organising ability devoted by Sir Horace Plunkett and his associates to the task of building up a system of co-operative credit, the results, so far as the deposit side is concerned, have been of the most meagre kind. This, the Chairman and Professor Bastable think, is due partly to the policy of State loans to societies from the funds of the Department of Agriculture and of the Congested Districts Board—a policy the discontinuance of which, save in exceptional cases, is unanimously recommended by the Committee. The competition of the Post Office Savings Banks, with their greater secrecy, their State guarantee and a steady rate of interest, is referred to as one of the greatest difficulties besetting the early stages of a credit society. To a small depositor security is and ought to be the most important point for consideration. For these various reasons the two members referred to urge strongly the desirability of supplying, through the agency of the Department of Agriculture and Technical Instruction, a guarantee for the payment of the smaller depositors in the case of all societies that fulfil the necessary conditions. They suggest that this guarantee should take the form of providing that in the case of a defaulting society any debt due to the smaller depositors, after the liability of members had been exhausted, should be met by the Department. This guarantee should apply only to individual deposits not exceeding £30 in amount, and the total of guaranteed deposits should be determined in the case of each society with reference to the requirements of the society's area. The Joint Stock Banks would probably gain, rather than lose, by the development of agricultural credit secured by stimulating the growth of depositors in credit societies. Also, while the growth of the spirit of self-help is very desirable, the functions of the State are in all modern countries being extended, in many instances for the purpose of affording wider liberty for the individual, as in the regulation of industries, educational agencies, and facilities for the exercise of thrift. Each case has to be judged on its merits, and in reference to the general policy of the State. Judged by the possible liability imposed on the Department as compared with the advantages likely to result, the Chairman and Professor Bastable hold with confidence that the proposed limited guarantee of deposits is not open to any objection either on the ground of interference with any form of commercial enterprise or of weakening the spirit of self-help and private initiative which it is so desirable to stimulate by opening up a wider field for its operation.

Rev. Professor T. A. Finlay, M.A., states that he is in agreement

**Note by
Rev. T. A.
Finlay.**

with so large a portion of the Report that he feels justified in signing it. He does so, however, with several reservations. To one of the main recommendations of the Report—that the Department of Agriculture and Technical Instruction should undertake the organisation and inspection of credit societies in Ireland—he finds himself unable to subscribe. He does not agree with the suggestion that such societies as are organised in connection with the proposed Agricultural Credit Section of the Department, or such as having been otherwise organised may submit to its control, should obtain contributions from the Department towards the defraying, wholly or in part, of their cost of audit in cases where the profits do not admit of such being paid from the society's own funds; and, finally, he dissents from the recommendation that no central credit institution should for the present be formed by the existing societies.

Father Finlay believes that to organise co-operative societies successfully it is essential that the organiser should have a strong personal belief in the efficacy of self-help, and genuine enthusiasm in urging this belief upon others. Co-operation wherever it is widely spread is more than a policy; it is almost a creed. The State may encourage and assist the efforts of a co-operative body, but this without appropriating its functions or invading its sphere of work. With regard to the supervision of credit societies by the Department of Agriculture, the credit society, like all co-operative societies, is essentially a self-help institution. The fundamental principle upon which it rests is that its members shall combine to promote their own interests by their own efforts and in reliance upon themselves. Hence he contends that a society, if it is to fulfil its purpose, cannot share responsibility for its work with any outside body; he is opposed, therefore, to the supervision of credit societies by the Department of Agriculture. With regard to the possibility of providing and maintaining a central credit institution to which local credit societies should be affiliated, Father Finlay thinks that the evidence offered to the Committee amply proves the urgent need for such a central institution, and he considers that the agency best fitted to take up this work is one representative of the societies and wholly co-operative in character. The Irish Agricultural Organisation Society, he states, fulfils these requirements, and is rendering the services which are required. If it has hitherto met inadequately the needs of the societies, the cause has been lack of sufficient funds for the purpose. That disability, he continues, has been removed by the Development Commissioners, and he thinks that the I.A.O.S. is now in a position to render to the societies the services of inspection and

guidance which are the main benefits a central institution can give them.

Sir Robert Anderson and Dr. Kyle Knox concur with the views expressed in the note of the Rev. T. A. Finlay. **Notes by Sir R. Anderson and Dr. Kyle Knox.** Dr. Kyle Knox further recommends the establishment in Ireland of land mortgage associations similar to those which exist upon the Continent, with any necessary modifications. These associations would be based upon the principle of the co-operation of the landholders and farmers of a country for the creation of a credit security which does not now exist, and could advance funds to farmers for the provision of stock, farm buildings and farm implements not met by Government grants.

Mr. Walter Kavanagh, D.L., states in a note that he signs the **Note by Mr. Kavanagh.** Report in deference to the wider knowledge of his colleagues on the subject, but that after hearing and considering the evidence his private opinion is that the present facilities in Ireland for obtaining credit for agricultural purposes are sufficient. He believes, however, that whilst the present Joint Stock Banks with their network of branches all over the country, and the keen competition amongst them are sufficient to meet the requirements of the great majority of agriculturists, these banks could do more to meet the requirements of the small borrower by lending in lesser sums for longer periods, and by reducing the expenses consequent on obtaining a loan. Such extension of their business would be as much to their own advantage as it would be to that of the customers themselves. Assuming, however, that further credit facilities are needed by the small borrowers of Ireland, he agrees with the suggestions and recommendations of the Committee for carrying out certain alterations in the present system of agricultural credit societies in Ireland.

A useful English Bibliography is appended to the Report. The Committee state that most of the publications therein referred to have been utilised by them in the preparation of their Report. Complete sets of draft Rules for both limited and unlimited liability Credit Societies are also included.

The Minutes of Evidence taken by the Committee, together with the various Appendices, will, it is understood, shortly appear in a separate volume.

TECHNICAL TRAINING OF WORKERS IN FRANCE AND GERMANY.

By H. GARRETT, B.Sc., PH.D., *Inspector Technical Instruction Branch.*

It was my privilege last November to visit France and Germany on behalf of the Department and in company with my former colleague, Mr. Smail, who represented the Education Committee of the London County Council.

Our object was to make a personal study of the systems in operation in these countries for the training of workers for industrial pursuits.

We visited some 33 institutions of an educational type, and saw 111 classes in operation, so that the opinions formed are the result of as wide observations as the limited time at our disposal permitted.

In France the study of the system was confined to Paris. In Germany we had an opportunity to see the work in Munich, Leipzig and Berlin. Everywhere we were received with the greatest courtesy, and the responsible authorities spared no pains to help us to form correct views on the working of their systems.

I should like to make it quite clear at the outset that in neither country is there anything entirely analogous to the Technical School, as we know it in this country. Paris has concentrated its efforts on training those who are to be industrial experts and those who are to take the lead among its workmen; its aim is directed to training highly skilled men to occupy later on the positions of foremen in various trades. The city, as a city, makes no attempt to improve the status of the ordinary workman. It does not provide him with either a theoretical or a practical training, but private philanthropic efforts there are which forcibly remind one of the old South Kensington Science and Art Classes. The German system is much more thorough and comprehensive. It aims at providing a suitable training for every man and even every woman, no matter what his or her occupation may be. Its whole object is to build up a great industrial nation, partly by giving those who are to be the leaders of industry a highly specialised training, partly by the thorough instruction, in special schools, of those who are to occupy the middle positions, and, lastly, by a general uplifting of the masses of skilled and unskilled workers in what are called Continuation or *Fortbildung* Schools. One feature is, however, common to both the French and the German systems. Both are designed to fit in closely with the system of apprenticeship.

TECHNICAL TRAINING OF WORKERS IN FRANCE AND GERMANY.



Fig. 1.—L'École Estienne (Day Trade School for Printing), Paris.

TECHNICAL TRAINING OF WORKERS IN FRANCE AND GERMANY.

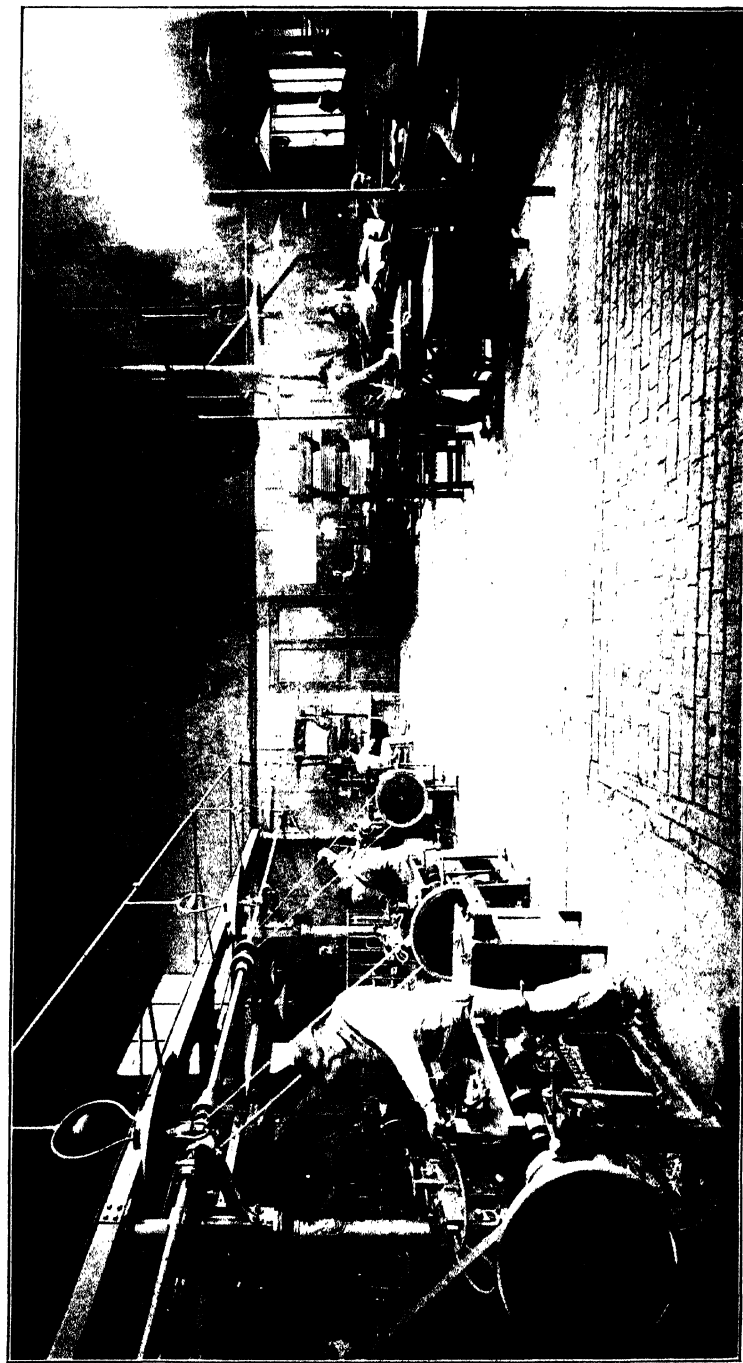


Fig. 2.—L'École Estienne—Type-founding Workshop.

TECHNICAL TRAINING OF WORKERS IN FRANCE AND GERMANY.



Fig. 3.—L'École Estienne—Printing Workshop.

TECHNICAL TRAINING OF WORKERS IN FRANCE AND GERMANY.

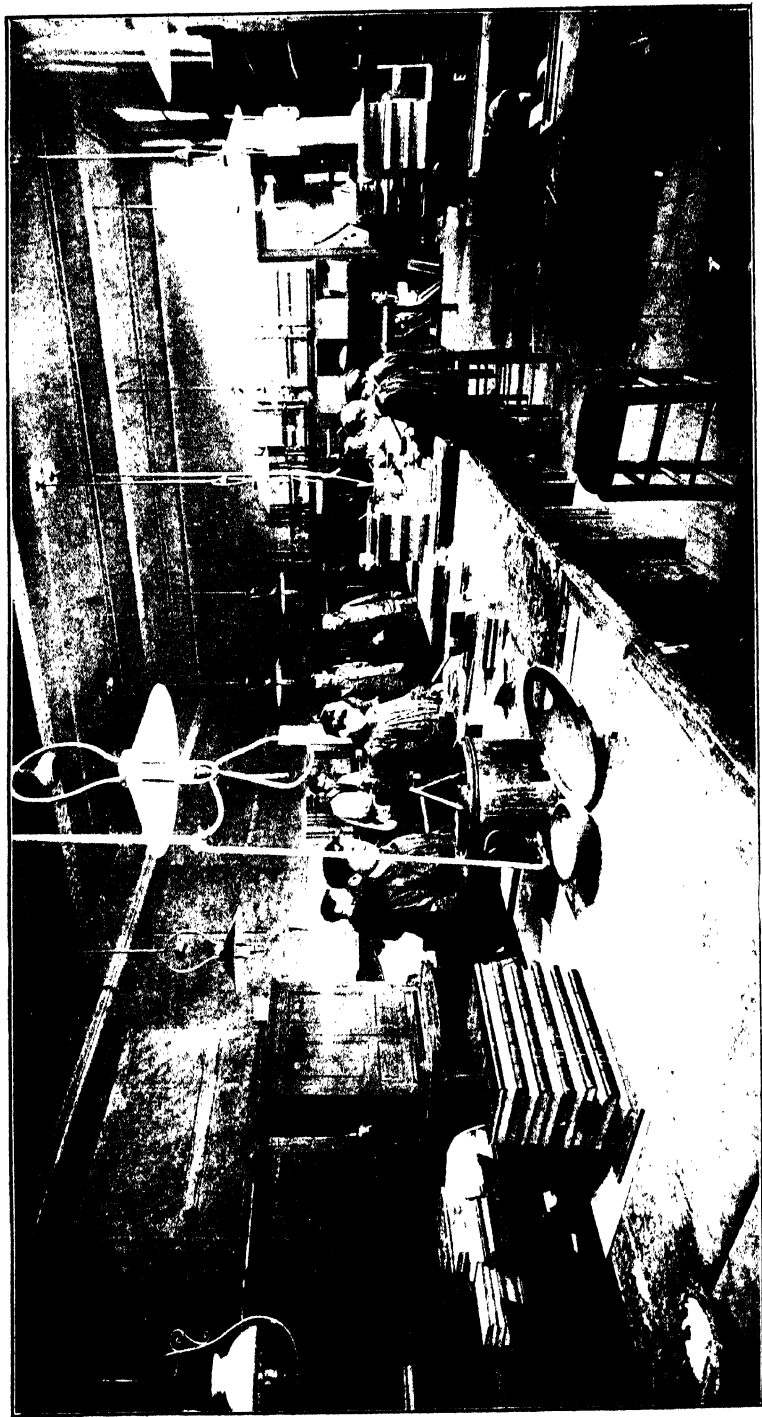


Fig 4.—L'École Estienne—Bookbinding Workshop,

I do not propose to describe at any length the Parisian schools for the training of highly skilled workers. There

**Day Trade
Schools.**

are seven of them for boys and eight for girls, and they are frankly Trade Schools, or as they are called *Écoles Professionnelles*. We visited five of them and were much struck with their completeness of organisation and equipment. They are all day schools, and the buildings are designed and used almost exclusively for Trade School work. They are not, as in England, Evening Technical Schools which have grafted on day work. In consequence the equipment is less showy, but approximates much more closely to workshop conditions than does ours.

The pupils enter by examination after leaving the Primary School, and there is very keen competition for places. In one case we found that five times as many entered for the examination as could be taken. The pupils remain at the schools for three, or in some cases, for four years, the duration of the course being the same as the apprenticeship period for the various trades. At the end of the course there is a leaving examination conducted by outside examiners, and the pupils enter the trades directly as improvers at about 30 francs per week. Their progress afterwards depends on the ability they show, but they normally become full journeymen in the course of a few years.

In these schools the hours of working are longer than in any educational establishment in this country. In the *École Diderot*, for instance, which is a school for the engineering trades, the pupils work 51 hours per week, and are thus accustomed from the beginning to trade conditions. The greater part of the time spent in the schools is devoted to practical trade work, but instruction in theory and drawing is also given.

Paris undoubtedly affords as fine examples of trade schools as are to be found anywhere, and the *École Estienne* or School of Printing is one of the most complete of its kind in existence, but at the same time not essentially different from similar schools in England, and the chief lessons to be learned from them are that trade schools succeed best when they are separate institutions, entirely disconnected from Evening Technical Schools, and when they are so organised as to replace apprenticeship. With these few observations I pass on to Germany, from which much more is to be learned by us.

The German system of Technical Education is divisible into three sections. It reaches its highest development in the Technical University, or so called **Technical Training in Germany.** *Technische Hochschule*—the largest and best known examples being those at Charlottenburg

and Munich, in each of which there are from 2,000 to 3,000 students, destined to become the leaders of industrial and constructive enterprise. Parallel with the *Technische Hochschule* stands the *Handelshochschule* or Commercial University, which does for the distributive side of industry what its sister institution does for the constructive side. These commercial universities are large and independent institutions which have no real analogue in this country although something of the kind has been attempted in connection with modern universities. They are the training ground for men who are to become captains of industry and commerce and teachers of higher commercial classes. The students are mainly recruited from secondary schools, but include also a number of men who have had business experience.

Below the Technical and Commercial Universities stand institutions which are of the character of middle schools. These schools are naturally of a somewhat varied type, depending upon the kind of product they are meant to turn out. Probably the most universal type is the Building School, or *Bauschule*. In Bavaria there are 4 such schools; in Prussia 23. These schools are all day schools, and they aim at turning out men who are to be master builders, builders' clerks, draughtsmen in architects' offices, and municipal employees in connection with town building schemes. In short, the products of the schools are the men who will have to work out the details of other people's ideas.

Probably, however, the most widely distributed type of middle school is the Commercial School, an example of which was seen in the Leipzig Commercial School. This school takes pupils from the primary school and gives them a full day course for three years. Its object is to provide well-trained youths for entry into business. It will thus be seen that it does for commerce what the trade school does for trade. After leaving the school the pupils are apprenticed for two years to business firms.

It will be clear from what has been stated that in certain directions, at least, provision has been made for the thorough preliminary training of the better class of employee, but for the training of the mass of its workers Germany relies on its Continuation or *Fortbildungs Schulen*.

The continuation system reaches its highest development in Munich, and the success there achieved is primarily due to Dr. Kerchensteiner. The organisation which he has built up applies, with certain modifications, to the other centres visited—Leipzig and Berlin.

To understand the position it will be necessary in the first place to give an outline of the system.

In Germany attendance at a Primary School is compulsory up to the age of 14. From the Primary School the great bulk of the

pupils pass directly to trade, industry or commerce. The supervision of the State does not, however, end there, as for all practical purposes it may be said to do with us. Through the Continuation School it is maintained up to the age of 17 or 18—the age at which apprenticeship ends. In Munich every boy who is at work of any kind, and not attending a higher school, is required by law to put in from 8 to 9 hours each week at the Continuation or, as we would call it, the Technical School. This time is not additional to his week's work, but forms an essential and an integral part of it. The instruction is given in day classes, and every boy is required to spend two half-days at the Technical School for at least three years.

Before proceeding further, it will be best to set out clearly the aims which this magnificent piece of organisation **Technical School** has in view.

Ideals. The great object of the schools is to produce useful citizens. A useful citizen is defined by Dr. Kerchensteiner to be one who contributes directly or indirectly through his work towards making the State a better and more cultured community. To effect this object he points out that the Technical School has three problems to solve :—

- (1) It must cultivate capacity and craftsmanship, together with a delight in the exercise of skill.
- (2) It must accustom pupils in their youth to place their skill at the service of their school-fellows and companions.
- (3) It must, as far as possible, connect the preparation for service, respectfulness towards superiors, and public spirit, thus acquired, with an insight into the aims of the community.

Briefly stated, one may say that the schools aim at the cultivation of skill, intelligence and public spirit. It will be admitted that all three are essential for the production of good citizens. The methods taken to achieve these objects and the results given by the system must now be considered.

When a pupil leaves school, i.e., when he reaches the age of 14, or as soon after that as he passes out of the

The Technical Curriculum. Eighth Standard, he is drafted into the Technical School. There he is classified according to his occupation ; if he is an apprentice mechanic he

is placed in the mechanics course, if he is a barber's lather boy in the barber's course, if a shoemaker in the shoemaker's course, if a chimney sweep in the chimney sweep's course, and so on. There is a special course for every occupation in which there are sufficient pupils. Last year 54 such courses were conducted in

Munich. In these courses the subjects studied are clearly defined—all the students of similar occupation taking identical courses. It is interesting to note that the courses were drawn up in the first instance by committees of teachers, in consultation with the inspectors. These courses were then thoroughly discussed with the representatives of every Trades Union and Employers' Federation concerned or, where such unions did not exist, with selected employers and tradesmen. In this way there can be no doubt that courses have been secured, which are not only educationally progressive, but are also thoroughly practical. In passing it may be remarked that there is no question of the advisability of a "Course System." No one thinks of any other possibility and no better instance of its success could be cited.

Broadly speaking, the courses followed during the three or four years deal with the following main lines:—

- (1) Practical trade instruction.
- (2) Drawing applied to the particular trade.
- (3) Reading and composition.
- (4) Arithmetic and book-keeping.
- (5) Civics.

A bald statement of the subjects taught gives little idea of the character of the work. Each of the subjects is

Specialisation. specialised to suit the needs of the pupils.

Further, special needs are catered for by replacing some of the above subjects by others, e.g., instrument makers get instruction in physics, in order that they may understand the instruments they will be required to construct. In certain cases, of course, no drawing is done, the most important being the Commercial Course, where the subjects taken are Writing, Civics, Commerce, Materials of Commerce, Commercial Geography, Correspondence, Book-keeping, Theory of Exchange and Arithmetic. Only 10 per cent. of the students appear to be engaged in occupations of an unskilled character, so that the Blind Alley type of employment is comparatively a small problem in Munich. On the other hand, in Berlin it reaches much more serious dimensions. In the Berlin schools nearly 40 per cent. of the students are engaged in occupations of the Blind Alley type. It is, however, necessary to add that while in the first year of the course there are some 6,000 such students, the number diminishes in the second year to 5,000, and in the third to 3,000. The reason assigned for this is that the students gradually become absorbed into occupations of a more permanent character.

The cultivation of skill and craftsmanship is accomplished in the workshops of the schools. It is hardly necessary to state that each of the eight schools in Munich attempts to deal with a limited

TECHNICAL TRAINING OF WORKERS IN FRANCE AND GERMANY.

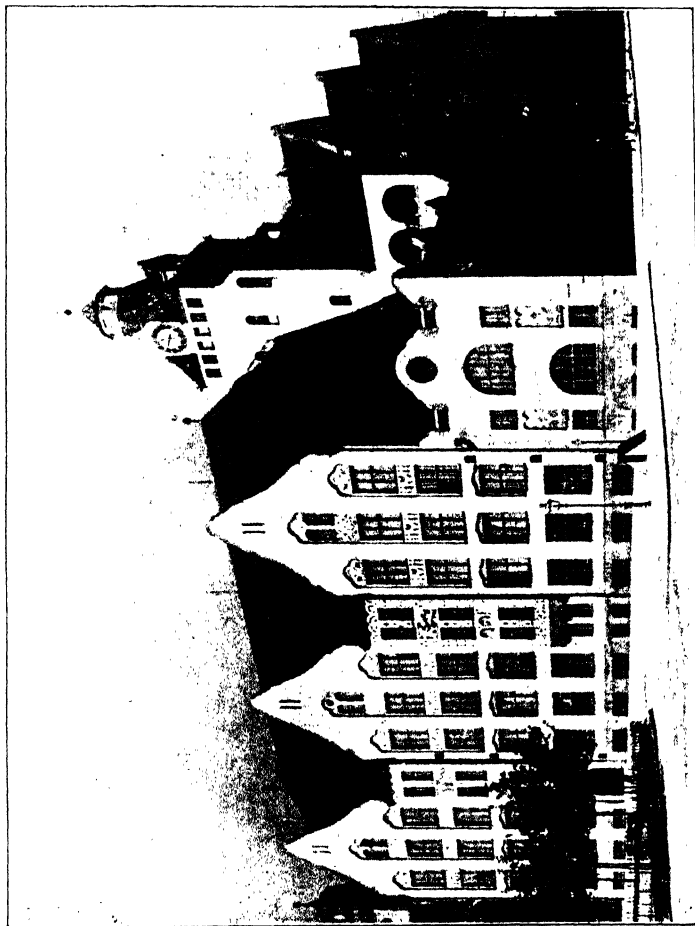


Fig. 5.—One of the ten Continuation Schools of Munich.

TECHNICAL TRAINING OF WORKERS IN FRANCE AND GERMANY.



Fig. 6.--Art Metal Workshop, Munich.

TECHNICAL TRAINING OF WORKERS IN FRANCE AND GERMANY.



Fig. 7.—Apprentice Waiters receiving instruction in Munich.

TECHNICAL TRAINING OF WORKERS IN FRANCE AND GERMANY

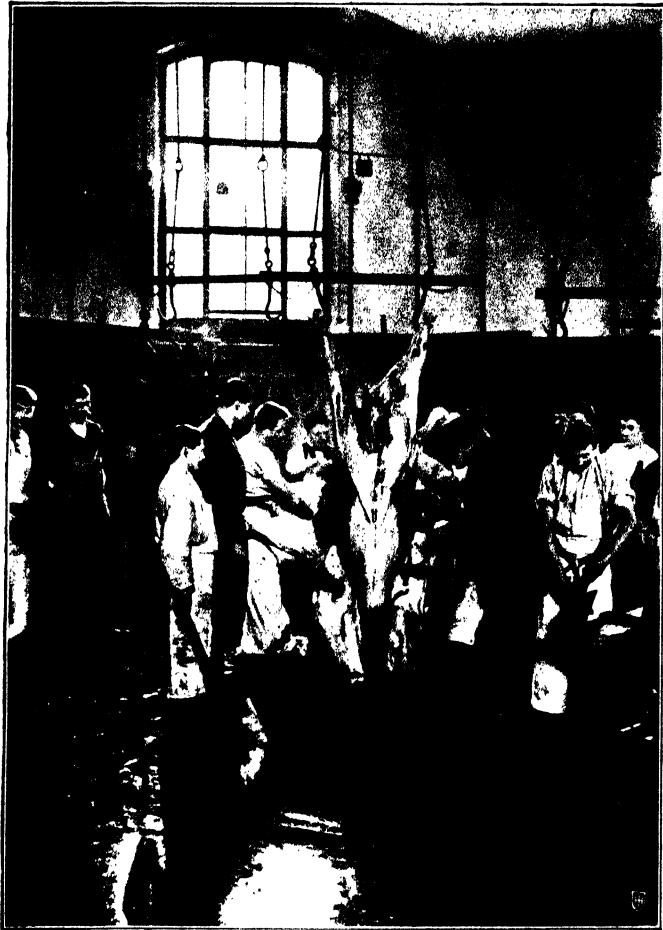


Fig. 8.—Butchers' Workshop, Munich.

number of courses only. Thus the largest school is divided into two sections, one called the Technical Section, providing for various engineering and wood-working trades, the other being confined to the numerous printing trades. This school is the only school where printing trades are taught. In the same way other schools provide for certain definite trades. The workshops were found to be thoroughly well equipped for their purpose. The equipment is not elaborate, but exceedingly useful and well utilised. Each workshop is designed to accommodate not more than 16 students, and well graded courses are followed, designed to give students a thorough training in all the operations of their trade. A considerable number of the classes were seen, and the impressions produced were that a high standard is being reached, and that in the training of skill the schools are eminently successful.

With regard to the second object of the instruction—the training of intelligence—it may be remarked that all educational progress is necessarily accompanied by a development of intelligence. The programmes which have been indicated show, however, that special provision is made for carrying on the literary and general education of the pupils. More, even than this is done, for it was impossible not to be struck by the extraordinarily successful efforts made in all the three cities visited to focus the instruction on the particular industry in which the pupil is engaged so that he may gain a comprehensive knowledge of everything pertaining to his trade. One subject to which particular attention is paid is materials. The materials chosen are, of course, those which enter into his special trade, and the instruction deals with their properties and manufacture. Everything likely to assist the pupil and give him an intelligent interest in the things he handles is considered. Again, the arithmetic taught is highly specialised. In Berlin it was found that the ten Directors of the Continuation Schools had jointly prepared a whole series of arithmetics for joiners, mechanics, plumbers, commercial clerks, etc. Book-keeping, again, as seen in classes for booksellers in Leipzig, was specialised in the direction required by those engaged in the trade. But perhaps the most interesting specialisation was seen in the drawing classes. The main object in the teaching of drawing for a large number of trades is to be found in its application to craft work. The teachers keep this object very clearly in view, and train their students from the earliest stages to apply their designs to the particular craft in which they are engaged. Thus, in a class for bookbinders, book-cover design is the prime aim, and even in one year excellent designs are produced and carried out on book covers. It is important to note that here we have teachers who have every inducement to give the pupils what they consider best and most soundly educational. Their classes cannot forsake them, they

are obliged to attend, and yet they have decided to abandon the old methods which devoted the early years to freehand, model drawing and space filling. No stronger argument could probably be used against these methods, which in our own schools were until recently rapidly killing all desire for art training on the part of artisans. One of the strongest impressions made by the work seen is that in our teaching—particularly of drawing—we have still to realise the immense educational incentive produced by the direct application of the lessons. One might almost go so far as to say that no exercise should be considered complete until it has been usefully applied.

These remarks will be sufficient to show the methods which have been adopted for the cultivation of intelligence and their success.

In Germany there is an astonishing uniformity of opinion as to the need for definite instruction in civics. It is, therefore, provided for all Continuation School students. The instruction includes such subjects as the duties of an apprentice and the right use of time in preparation for life work. Instruction in personal hygiene is given, together with the requisite information as to the structure of the body. From this point the teaching proceeds to the history of the evolution of trade and industry in Germany and the position of the trade, to which the class belongs, in its relation to other industries. This is followed by some account of Gilds, Trade Unions, Employers' Federations and Chambers of Commerce. The most important trade regulations of modern times are dealt with and the relations of one trade to another. The highest stage of the instruction deals with the district: its public, social and industrial organisation, the local rights and duties of the tradesman and the position of local councillors. The State receives similar treatment, and the position of the student as a member of the State is explained to him. Finally, the organisation of the Empire and its Colonies is dealt with. It may be stated that some excellent lessons on this subject were heard. Great freedom is allowed to the teachers in their method of treatment. Free use is made of common knowledge, current events and statistics.

To what extent this instruction produces better citizens it is not possible here to say, but at all events if a German neglects his civic duties he does not do so through ignorance.

A word here may not be out of place as to the differences between Munich, Leipzig and Berlin.

TECHNICAL TRAINING OF WORKERS IN FRANCE AND GERMANY.

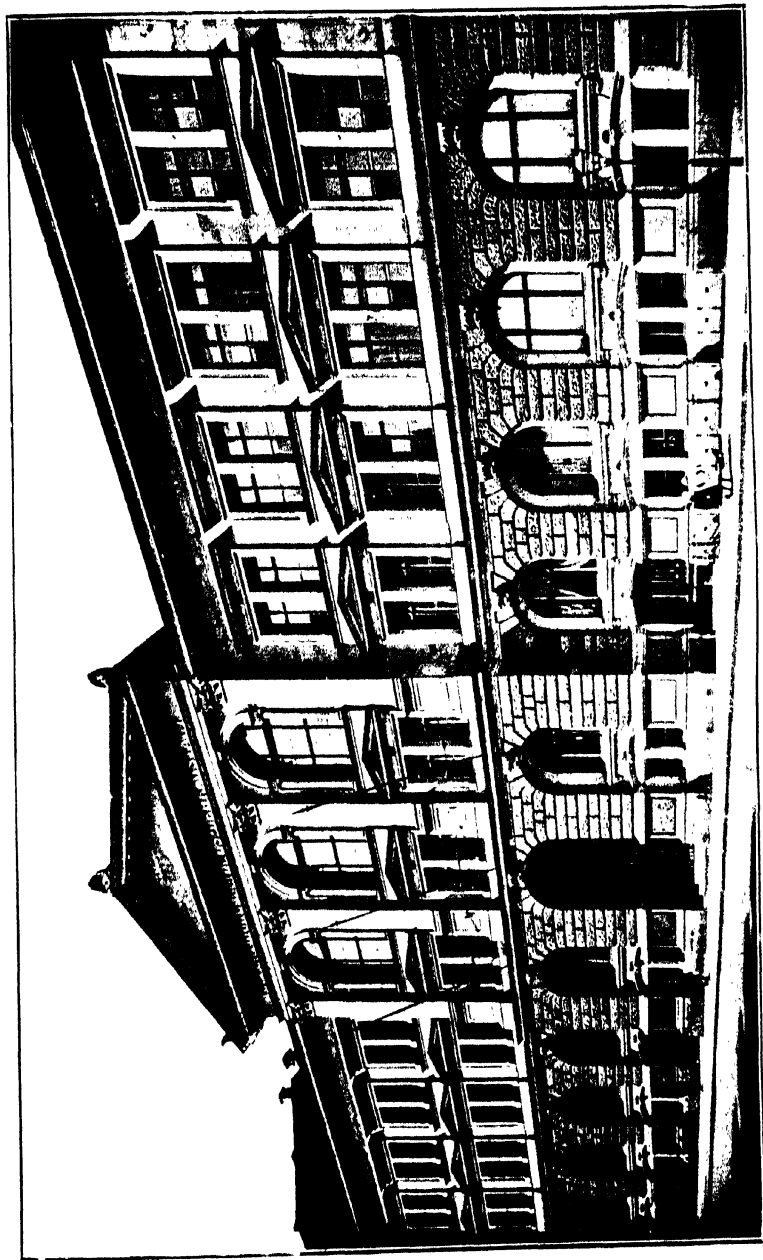


Fig. 9.---Day Commercial School, Leipzig.

TECHNICAL TRAINING OF WORKERS IN FRANCE AND GERMANY.

Fig. 10.—A class receiving instruction in Book-keeping at the Booksellers School, Leipzig.

TECHNICAL TRAINING OF WORKERS IN FRANCE AND GERMANY.

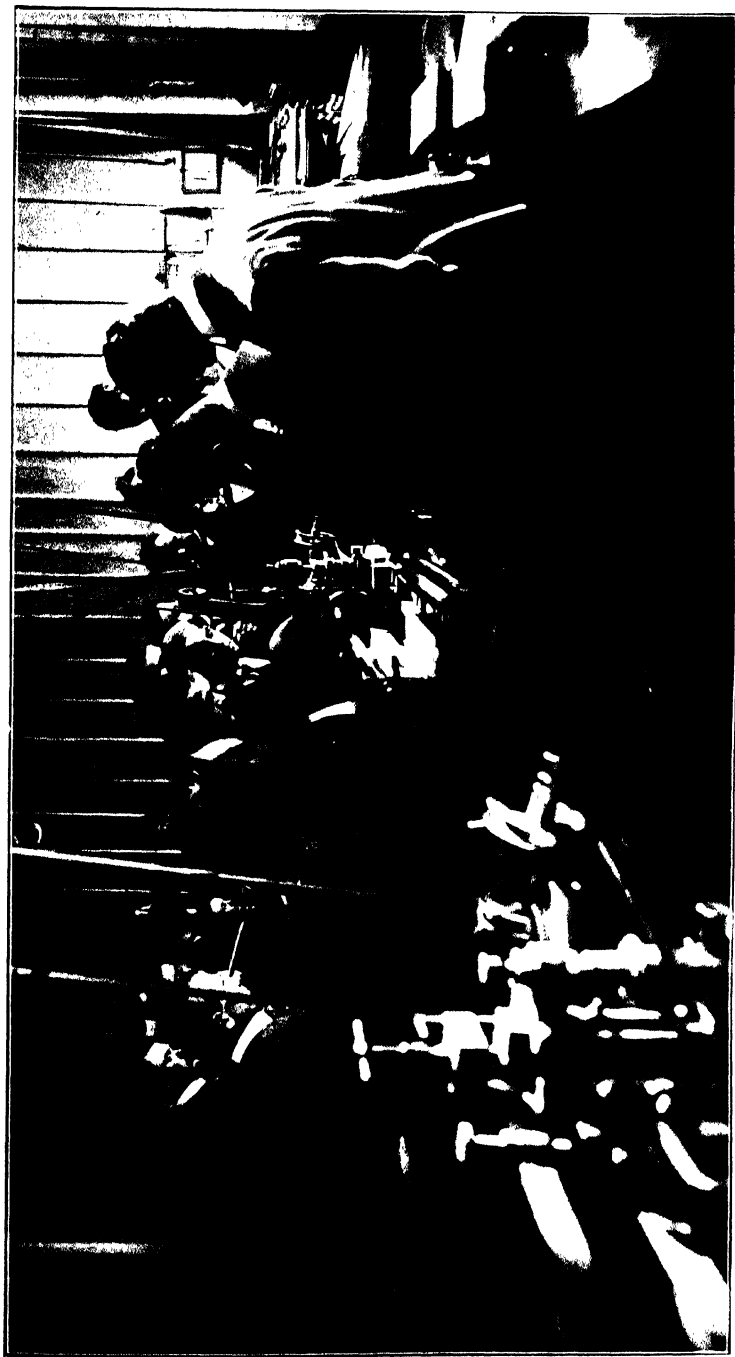


Fig. 11.— A class from the Booksellers' School, Leipzig, receiving instruction in Processes during an excursion to the works.

It has been said that 15 years ago Leipzig was in the forefront of the technical movement, but that since then it

Schools has fallen into a less prominent position. There
in are evidences that it does not intend to remain
Leipzig. there, the most important of these being a move-

ment to build and equip a special Continuation School to draw into itself all the printing trade work. Leipzig is particularly interesting, first because one sees there the German system in process of evolution, and secondly, because it is the centre of the book production trade. One finds there schools, initiated by Gilds and Federations of Employers for the education of their apprentices. Thus the Bookbinders' Gild conducts a Technical School for Book-binding. It receives support from the State to the extent of about half the cost, and a further contribution from the town of about one-third the cost. The Printers' School, the Booksellers' School and the School of Commerce (in so far as it deals with business apprentices) are other instances in point. The mere fact that these schools have been founded by employers, one as far back as 1881, shows how much alive employers are to the need for the further education of their apprentices. The main differences from Munich are :—

(1) Much of the control of the schools still rests in the hands of Employers' Federations, though all the schools are aided by the town and the State. This control is likely to pass, in the near future, to the town.

(2) The time required for apprentices is usually 8 hours for the first 3 years, and 4-5 hours in the fourth year. Exceptions are found in the case of the Booksellers' School, where 12-16 hours is required, and in the School of Commerce, where 12 hours is required.

(3) While the whole tendency now is in the direction of practical instruction on Munich lines, the organisation for this purpose is still far from complete.

Berlin is in some respects considerably behind the other two cities. There are 10 Compulsory Continuation

Schools in Schools for boys, but these are not special build-
Berlin. ings, reserved for the purpose but elementary
schools, utilised each day from 2 p.m. to 8 p.m.

Pupils are required to put in 6 hours per week. During the present session it has been made compulsory for girls to attend, and there are now 11 schools for girls. There are two very distinctive features in the continuation school organisation of Berlin.

(1) The employers and the school authorities are against the introduction of practical trade work. Demonstration workshops only are provided.

(2) Connected with a group of Compulsory Evening Schools in

each division of the city there is a Voluntary School (*Wahlschule*), where those students who desire to do so may take out additional subjects.

Having now described and contrasted the systems in operation in the three cities it is desirable to say a few words with regard to the human elements concerned, i.e., the boys, the teachers and the employers.

One of the preconceived ideas with which the study of these schools was approached was that the compulsory nature of the system must produce in the boy a feeling of listlessness and apathy which would detract largely from efficiency and progress. It is sufficient to say that this idea received a severe shock from actual contact with the pupils, and it is no exaggeration to assert that the keenness and interest shown in the numerous schools and classes visited would have done credit to our own system. The statement that the boys like to come because they feel it is in their own interest is evidently true. Further, they are said to prefer attending school to the routine of their trade or business. At the same time it is admitted that in the beginning some come unwillingly, but that as time goes on they enter into the work with spirit. Another objection which may be urged is that all and sundry are gathered in, and that the general level of intelligence must thereby be lowered. It is true that a few—as happens in all schools—make indifferent progress, and in consequence are obliged to repeat a course, but nothing seen would countenance the opinion that this difficulty is any greater in German schools than at home.

The success of the schools depends, in the long run, on the teachers. The best system of organisation can do little unless the teachers are keen, capable and well trained. Two methods of training teachers are used. Teachers of general subjects and theory are elementary school teachers who have been given a course in trade work. This is not done with the object of enabling them to teach the trade, but merely in order that they may be able to teach such subjects as German and Arithmetic from the trade point of view. It is intended to eliminate the academic method of instruction and is eminently successful in so doing. The other system is to take the tradesman and give him instruction in pedagogy, theory and drawing, and finally experience of teaching under the supervision of the principal of a school. Teachers of this type are, of course, employed for trade work, mechanical drawing and theoretical instruction in the principles of the trade and the properties of materials. This method corresponds to our "long course of training for manual instructors," but is not confined to wood-workers and builders, but extended to all trades.

The small amount of science work done is in the hands of University or Technical High School men. Commercial schools also draw teachers from the Commercial High Schools. Drawing teachers, for arts and crafts, are taken from the Art Craft Schools and are men practising the craft.

Turning now to the attitude of the employers. In Munich the attitude was said to be entirely favourable to

The Employers. the schools, the opinion being expressed that in these days of intense specialisation it is not possible for an apprentice to obtain an all round knowledge of his trade or business. Everyone knows cases of this extreme specialisation, such as that of the mechanic who, for twenty years, did nothing but turn cylinders of a definite standard size. Everyone knows, too, the deadening effect of such a routine operation. Nowadays the apprentice is only too liable to be kept at some particular operation for which he happens to show an aptitude, with the result that he does not learn his trade as such, but only a very limited portion of it. In worse case still is the apprentice who joins a firm which manufactures only a limited variety of standard articles. In both cases, when the conditions of the trade change even slightly the skill acquired ceases to be of value, and the worker is thrown out of work to swell the ranks of the unemployed.

The Germans believe that the remedy for all this is to be found in a thorough all round training in all the operations of the trade such as is given in their Continuation Schools, combined with a well regulated system of apprenticeship. The employer appreciates the assistance rendered by the school. It saves him expense, by eliminating the waste caused by want of skill, and provides him with workmen capable of undertaking any work that may be required.

A further evidence of the favourable attitude of employers is the fact that they have voluntarily given large sums for the better equipment of the schools. In the Munich Printing School alone equipment valued at £6,000 has been presented by employers. In Leipzig the evidences of a favourable attitude on the part of employers are even greater, for as has been shown they have equipped and run at considerable expense to themselves schools which are wholly or partially devoted to practical work. It has been decided to build and equip a school into which all sections of printing work shall be gathered, and the only question still undecided is whether the employers shall themselves build the school or whether they shall leave it to the town. Stronger evidence of the favourable attitude of employers could scarcely be looked for. In Berlin no practical trade work is done, and the attitude is said to be against

it, yet the employers in the printing and composing trades conduct a school of their own, containing some 1,400 pupils, which is equipped to a certain extent for practical work. The only objection raised to the inclusion of trade work was that the methods taught in the school sometimes conflict with those practised in the workshop, but it may perhaps be that the real reason is the desire to avoid the expense involved. Care has naturally been taken to cultivate the good will of employers. 'The time-tables are arranged to suit their convenience as far as possible, and in some instances classes are discontinued during the times of seasonal pressure and transferred to periods of seasonal slackness. A good employer can also, on an occasion of special pressure, obtain permission for the absence of his apprentices. This permission is used with considerable discretion. The average attendance in Berlin is 90 per cent. of the students on the rolls; in Munich it is even better.

It is necessary here to diverge for a moment from the school side of this subject in order to point out its relation to apprenticeship.

Apprenticeship in Germany is regulated by law. In no case, so far as I am aware, does the period of **Apprenticeship in Germany.** apprenticeship exceed four years, in many trades it is only three years. During the time while the youth is serving his apprenticeship he is obliged to attend the Continuation School. Usually this means two half days, either in the morning from 7 or 8 a.m. or in the afternoon from 2 p.m. At the end of his apprenticeship the youth becomes an improver by passing an examination in his trade. His future progress, as in France, depends on the ability he shows. He may remain an improver all his life, or he may become a master workman by passing another trade examination, which consists largely if not entirely in the making of some more important object called a *Meister Werk*. Only master workmen may now take apprentices. If an employer is not himself a master workman he must employ a fully qualified foreman, so that the State thereby secures that the apprentice shall have the advantage of thoroughly skilled supervision. It will thus be seen that in Germany the educational system is an integral part of the apprenticeship system, and that the State watches over the interests of the youth until he becomes a man. Further, the youth is made aware that he has a definite career before him, and that he has the means at hand to become thoroughly expert.

In what follows an attempt will be made to examine the system described from our own point of view and to compare its efficiency with that of our own.

Where attendance at elementary schools in Ireland is enforced we carry forward a boy under State supervision up to the age of 14, after which the State takes almost no further interest in his welfare until he becomes a man. Yet the interval between 14 and manhood is admitted to be the most critical in a boy's life. At present a very large proportion of those who leave school at or before 14 get no further instruction, and in the few years which follow they rapidly lose the benefits of the training they have had. Even from the monetary point of view this represents a very serious loss, for it has been estimated that up to the point where it drops the boy, the community has spent £80 on his education, and in the great majority of cases much of the benefit which he has obtained becomes lost, both to the individual and the community. He is turned loose into the world without the personal guidance and interest which he in former times received from the master to whom he was apprenticed. There is also little home supervision, and unless the boy joins a Technical School he is practically rudderless during the most critical period of his life. It is, therefore, important to discover what proportion of our young people who require further training are actually in attendance at a Technical School. It will be admitted that if Munich represents one of the most advanced German efforts, Belfast represents one of ours. Last year there were 3,355 male students in Belfast. At the same rate as Munich there should have been 9,360, nearly three times as many. Nor is this the worst feature. An average student in Munich receives at least 1,300 hours' instruction after he leaves the Primary School. An average student in Belfast probably does not receive more than 130 hours' instruction in the Technical School. It is clear, therefore, that the voluntary system touches only a fraction of the workers, and only gives them a training which in point of time compares very unfavourably with the liberal allowance received by our competitors.

Rightly or wrongly the Germans have come to the conclusion that a voluntary system of evening and Sunday schools does not meet the needs of the case for the young worker. They argue first that the time which can be got in this way is inadequate, secondly, that the student is not in a fit state to profit by the instruction, and thirdly, that there are many who, for one reason or another, cannot attend an evening school. There is, for instance, the case of the shop assistant who starts work at 8 in the morning and gets out at 7 or 8 in the evening. They naturally ask how he can be expected to have a meal and get to the school at half past seven, in fit condition to receive instruction. They naturally ask also how a tradesman, be he mechanic or plumber or carpenter,

can get to work at 6 in the morning, work all day and profit by instruction in the evening. They contend that it is neither right to expect it nor fair to the youth's physical development.

Two further points are worthy of notice. Our workshops are not utilised to anything like the same extent as the German ones, and the reason is obvious. An apprentice who has spent all day in his master's workshop cannot be expected to give up his evening to more workshop practice, and until we have day classes for such students the instruction must necessarily fail to reach a large proportion of those who need it. So long as the present conditions hold we must depend too largely on the master's workshop for practical trade instruction, and must give our attention chiefly to mechanical drawing and theory, so that the student's intelligence may be cultivated and that he may learn the principles underlying his trade. The fact is that the restrictions imposed on our schools by evening work almost prohibit the cultivation of skill and craftsmanship. In so far as that is the case they are debarred from fulfilling their duty in the production of useful citizens.

The second point is that there is an almost total neglect of civics and the cultivation of public spirit in our schools. This again is not the fault of the schools, but of the conditions under which our work has to be given. Students already give as much of their free time as can reasonably be expected of them, and even then cannot be given as much purely professional work as is desirable.

Anyone who sees the German system in operation must be forcibly struck with the enormous value of it to the nation. The great impression made on my mind was that a generation of this training, which began in Munich about ten years ago, will have the effect of making that nation the most skilful in the world, and will, as things stand, enable them to overwhelm all competitors, ourselves among the number.

It must not be assumed that the German system is above criticism, or that our own has not some characteristics which are wanting in theirs. It will have been noticed that on the professional side the training is solely directed to making the artisan a better artisan. It is not calculated to raise him above his status, but merely to improve him within certain rigidly defined limits. For that reason one finds plenty of trade work and everything calculated to improve skill and craftsmanship, but one finds no mechanical laboratories, no study of applied mechanics, of steam, of practical mathematics, practical geometry, builders' quantities, economics, accountancy or the like. These things are the perquisites of the upper layers of industry with which the artisan has no concern. Even in the evening and Sunday classes, for those

who have completed their apprenticeship, one looks in vain for the opportunities for such study. The only avenue to higher positions is through the Middle School, the *Technische Hochschule* or the *Handelshochschule*. From our standpoint this is a serious defect, but one which there is no likelihood of our falling into. In the same way if a pupil is an unskilled labourer the school does little to help him to a higher plane, and in short it may be said that the ladderless principle pervades the whole of German education.

Conclusions. The principal conclusions arrived at may be summarised as follows :—

(1) The basis on which any successful system of Technical Education must be founded being Elementary Education, it is urgently necessary that the compulsory clauses of the Education Act should be enforced everywhere in the country.

(2) The next few years must see a considerable development of day classes for apprentices up to the age of 18 if we are to hold our own in the world competition for trade.

(3) Any changes which may be made in the organisation of Technical Instruction should be combined and co-ordinated with reforms in our apprenticeship system.

(4) Further efforts should be made to train Technical School Teachers. Art teachers should have definite trade instruction in such crafts as compositor's work, lithography, engraving, cabinet-making, jewellery, textiles, and indeed in every trade for which a knowledge of art is required. Teachers of Introductory Courses should be given instruction in Technology, not with a view to teaching the subject, but in order that they may be able to apply their teaching of English and Mathematics to the needs of their pupils. Well qualified tradesmen of all kinds should receive instruction in theoretical subjects bearing on their trade as well as a training in methods of teaching.

(5) Throughout the schools, in the courses and in the individual lessons, greater efforts should be put forth to apply the teaching more directly to trade purposes.

TECHNICAL EDUCATION IN CONNECTION WITH THE IRISH WOOLLEN TRADE. *

By J. F. CROWLEY, M.Sc., B.A., A.M.I.E.E.

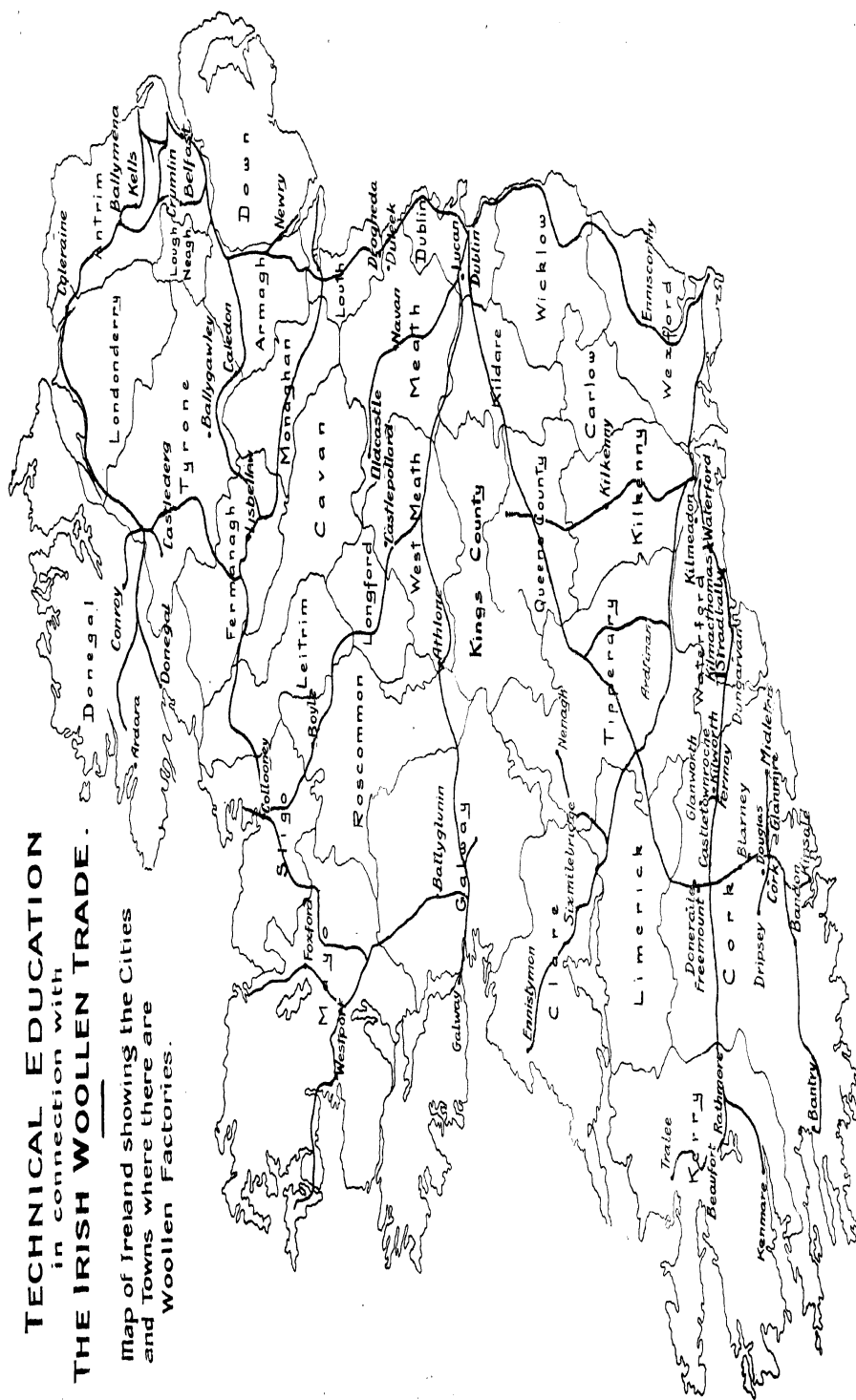
The Textile Trades occupy a position of very real importance in the industry of the United Kingdom. During **Importance** 1906, the year of the last Board of Trade Inquiry into Earnings and Hours of Labour, **of the** Woollen Industry. £50,000,000 was distributed in wages to 1,171,000 operatives, and these figures give no indication of the number employed, or of the wages paid in allied industries dependent solely or in part on these trades.

The following table, compiled in the main from the report on the Inquiry referred to, and from the Census of Production figures of 1907, will give some idea of the relative importance of the various trades, of their geographical distribution, and of the changes in the number of operatives between the Board of Trade inquiries of 1886 and 1906.

Trade.	Percentage of Total Textile Operatives.	Percentage change between 1886 and 1906.	Geographical Distribution of Operatives.
Cotton	45	+ 7.3	83% South Lancs, 7% N. parts of Yorks, Cheshire and Derbyshire; 4.5% Scotland; 0.15% Ireland.
Woollen and Worsted	23	— 4.8	72% West Riding, 4.9% parts of Lancs, 3.1% Worcester, Leicester, Gloucester, Somerset, Wilts, and Wales; 11.1% Scotland, 1.6% Ireland.
Bleaching, Printing, Dyeing, and Finishing	9.5	—	75% England and Wales, mainly Lancs, and Yorks, 17.5% Scotland, 6.8% Ireland.
Linen	8.2	— 12.5	65% Ireland, 28.6% Scotland, 6.4% England and Wales
Hosiery	3.5	+ 87.5	73% Leicester, Notts and adjacent parts of Derby; 14% Scotland, mainly Hawick and Galashiels; 2.9% Ireland (Balbriggan is a centre).
Jute	3.5	+ 3.4	95% Scotland, mainly Dundee.
Silk	2.6	— 28.6	36.5% Lancs and Yorks, 33% Cheshire, Warwick, and Staffs; 11.6 Norfolk, Suffolk, and Essex.
Lace	2.3	— 18.8	77% Notts. and Derby; 12% Ayrshire.

THE IRISH WOOLLEN TRADE.

Map of Ireland showing the Cities and Towns where there are Woollen Factories.



It will be noted that of the textile industries the woollen and worsted trade is second in importance only to the more highly organised cotton trade, and that, while an increase of over 7 per cent. has taken place in the number employed in the latter, a decrease of nearly 5 per cent. has taken place in the woollen and worsted trades in the same period. !

It should, however, be borne in mind that while the figures tabulated give a very good indication of the relative importance of the trades, if they are used as an indication of progress during the period under review, other factors must be taken into consideration. The number of operatives sometimes fluctuates rather rapidly; for instance, in the ten years prior to 1901, the number employed in the Scotch trade fell something like 27 per cent. Again, the number of "half-timers" has been reduced, and particularly in the weaving-shed machine outputs have increased, due to improvements in the machines themselves. Taking all these things into consideration, the position of the woollen trade does not give much cause for gratification, and certainly none to justify any relaxation in efforts to improve it.

When we consider the Irish Woollen trade we find an increase in the number employed, and an increase in the number of power looms, the number of spinning spindles remaining the same. The total number of looms at work is, however, so small that fully three quarters of them could find employment in one large West of England factory. Compared with the Scotch trade, with which it is closely allied, the industry is not prosperous, and the improvement effected has been confined to a limited number of manufacturers. For this slowness in development many causes may be put forward, some external to the trade itself, some internal. The more general use of cotton manufactured goods by the public, and of cotton yarn by the manufacturer, has affected sections of the trade.

Developments in Germany, Austria, Belgium, and Italy, and more recently in Japan, Australia, and New Zealand, have made competition keener in foreign markets, and when competition is keen abroad, the majority of the Irish Mills are not so successful in the home markets as the better-equipped English and Scotch Mills. Tariff barriers in Protected countries handicap the industry, and the recent revision of the American Dingley tariff has already had a favourable effect on certain trades.

It is, however, when we look to internal causes that we find the best explanation of our backwardness in a trade so eminently suited to the genius and to the temperament of our people.

We lacked, and still lack :—

- (a) Organisation, both in the Trade itself, and in the Factory.
- (b) Technical Education, and
- (c) Capital ;

the last largely because of our deficiency in the first two.

There is no lack of essential capital in a country which has over £100,000,000 in Banks, Savings Banks, and Government Funds, and no fear of entrusting it to sound industrial concerns can exist in a community which invests so largely in a first class textile organisation such as that of Messrs. J. & P. Coats.

Some half dozen years ago, the author was present in Dublin, at a meeting called to form an Irish Woollen Manufacturers' Association, a first step in the direction of genuine trade organisation. The movement, however, failed through lack of support from some manufacturers.

It may not be out of place to suggest here that owing to many causes, which need not be enlarged on, **Modern Competition.** petition has considerably altered during the last half century. To-day competition does not lie so much between manufacturer and manufacturer, as between one trade group and another.

When trade is bad with a Scotch Tweed Manufacturer, due for instance to foreign competition, the whole Border Trade is usually affected, and a similar condition of things prevails when there is a depression in Bradford worsteds, in the finer goods of the West of England, or the cheaper products of Dewsbury. Certainly one firm may stand reverses better than another, it may have larger reserves, or be otherwise in a favourable position. This does not, however, affect the alteration in the action of competition referred to, and it is to be hoped that the larger manufacturer will realise that a strong home industry is to his own trade advantage. If he does, he will undoubtedly be supported by the smaller manufacturers in any steps that may be taken to promote an organisation for the development of the industry as a whole. Such a trade organisation would make joint action possible in any direction in which it was needed, it would make known the important needs of the industry, and provide a "clearing house of ideas" for those interested directly or indirectly in the industry itself.

In considering the needs of the industry, technical education has been placed after trade organisation, not because it was considered less important, but because it was felt that an organised trade would be in a better position to aid in shaping an educational course to meet its requirements, and to take advantage of that course when provided.

Few people outside the industry realise to what an extent first class technical ability is required at every stage

**The Need of
Technical
Instruction.**

of the production of modern woollen cloth, and how far technical education is required to produce this ability. The wool enters the factory charged with "yolk" and "suint."

The first process it undergoes is "sorting," an operation requiring no little skill. It passes through the scouring room, then to the drying room, after which it is blended and oiled, this work being finished in the Teazer or Willey. It is then placed in an Automatic Feed, which uniformly feeds it on to the moving lattice of the Scribbler. It leaves this machine as a coarse loose band, and enters the Carding machine by one of several feeding devices. After leaving the Card, or Cards (there may be several) as a loose band or "sliver," it passes through the Condenser from which it emerges still finer as "slubbing," to pass on bobbins to the Mule or the Throstle Frame, where by a process of drawing and twisting, it is converted into yarn. This yarn, if intended for warp, viz:—the longitudinal threads of a cloth, is then wound on to bobbins, from a number of which it is re-wound on to the reel of the Warping Mill. It is finally wound from this on to the Weaver's Beam, being sometimes first passed through a Sizing Machine, after which it is ready for the Loom. If the yarn is intended for weft or the single thread crossing and interlacing with the warp thread, it may be used, as is American practice, exactly as it leaves the Mule, or the contents of several Mule Bobbins may be wound evenly and hard on to pirns to fit the weaver's shuttle. The cloth on leaving the loom goes to the "Burling and Mending Room." It has now to pass through several processes, depending on the material, and the style of finish required, such as Scouring, Stentering, Milling, Dyeing, Cropping, Steaming, Raising, and Pressing.

Such in brief outline is woollen manufacture as it is understood in this country, and it may be safely said that at every stage, careful and expert attention is required if the processes are to be on an economic basis, and if the finished article is to meet with the approval of the critical "buyer."

When in the late seventies depression overtook the Yorkshire trade, attempts, rather late it is true, were made to meet it by education, and in 1874—through the generosity of the Worshipful Company of Clothworkers—the Textile Department of the Yorkshire College, Leeds, was established.

**Technical Schools
and Colleges.**

A similar movement resulted in 1883, in the establishment of Textile Classes in Galashiels, which afterwards developed into the South of Scotland Central Technical College, an institution that has done

much for the development of the Scotch Tweed Trade. Many other Colleges devoted to the Woollen Industry have been established since, notably those at Bradford, Keighley, Hawick, Huddersfield, Dewsbury, Halifax and Batley.

In Belgium at Verviers, and in France at Roubaix, excellent Colleges have long been in existence, the first established as far back as 1855.

In Germany six of the Technical High Schools provide courses in Textile subjects, and, in addition, the student has open to him eight Textile Schools and seven Higher Special Textile Schools, one of which devotes itself to the Woollen Trade. The Prussian Schools particularly confined to this trade are the higher textile schools at Aachen and Cottbus, where spinning, weaving, finishing and dyeing are taught. In addition there are textile schools at Forst with departments for spinning, weaving, and dyeing, and at Sommerfeld and Spremberg for weaving only.

In Saxony, where the textile schools do not specialize so closely as in Prussia, there are higher textile schools at Reichenbach for spinning and weaving, and at Glauchau and Greiz for weaving only, and a textile school at Werdau with evening classes in spinning and weaving.

In the Royal higher textile school at Lambrecht, which is the only textile school in Bavaria, weaving only is taught.

In Wurtemberg there is at Reutlingen a Royal textile school with departments for spinning, weaving, and finishing and at Mühlhausen in Elsass a spinning and weaving school.

In Prussia each school is in charge of a Director and a Committee of mill-owners, while the government of all the schools is vested in the *Königliche Landesgewerbeamt* in Berlin. This body arranges for periodical inspection and provides the schools with the most recent textile information obtainable, including translations of important papers and articles from foreign periodicals.

The individual States appear to manage their own schools in a somewhat similar manner to that prevailing in Prussia, viz., with a responsible Director, local committees, and a central authority.

As showing the importance attached to the direct and indirect effects of technical education in the Yorkshire trade, it may be well to recall some remarks of Sir Swire Smith. In commenting on the successful recovery of the Woollen Trade from the continued depression that followed the Franco-Prussian war, he says, "No man conversant with the facts would presume to say that all the improvement . . . is due to Education, but it is fair to say it is mainly due to the spirit which has been roused and fostered by Education."

TECHNICAL EDUCATION AND THE IRISH WOOLLEN TRADE.

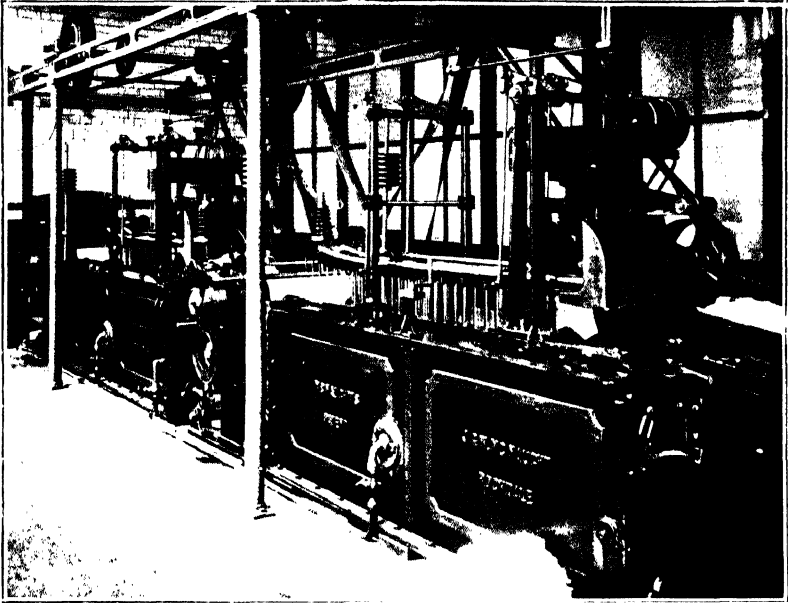


Fig. 1.—Wool Scouring.

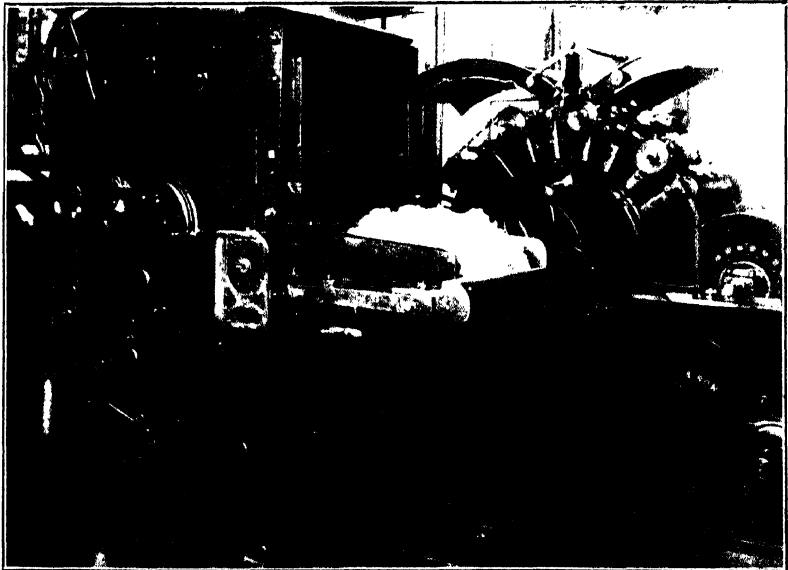


Fig. 2.—Willeying and Teazing.

University of Leeds.

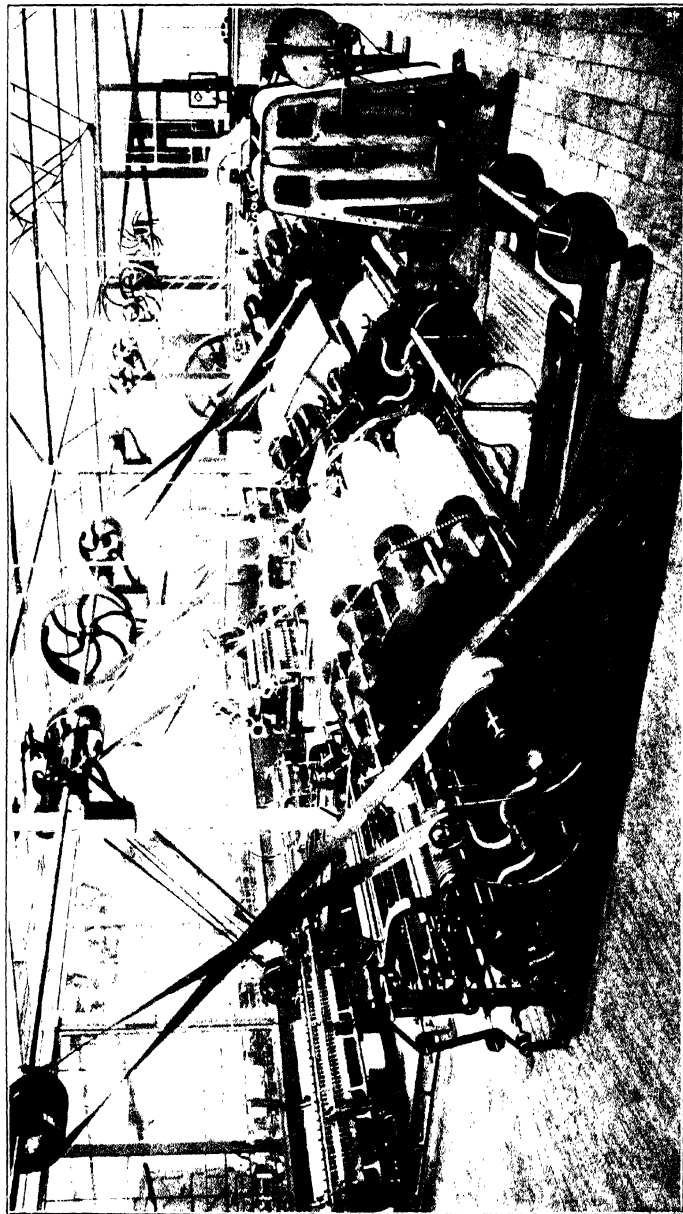


Fig. 3.—Carding and Spinning.

École Supérieure des Textiles. Verviers.

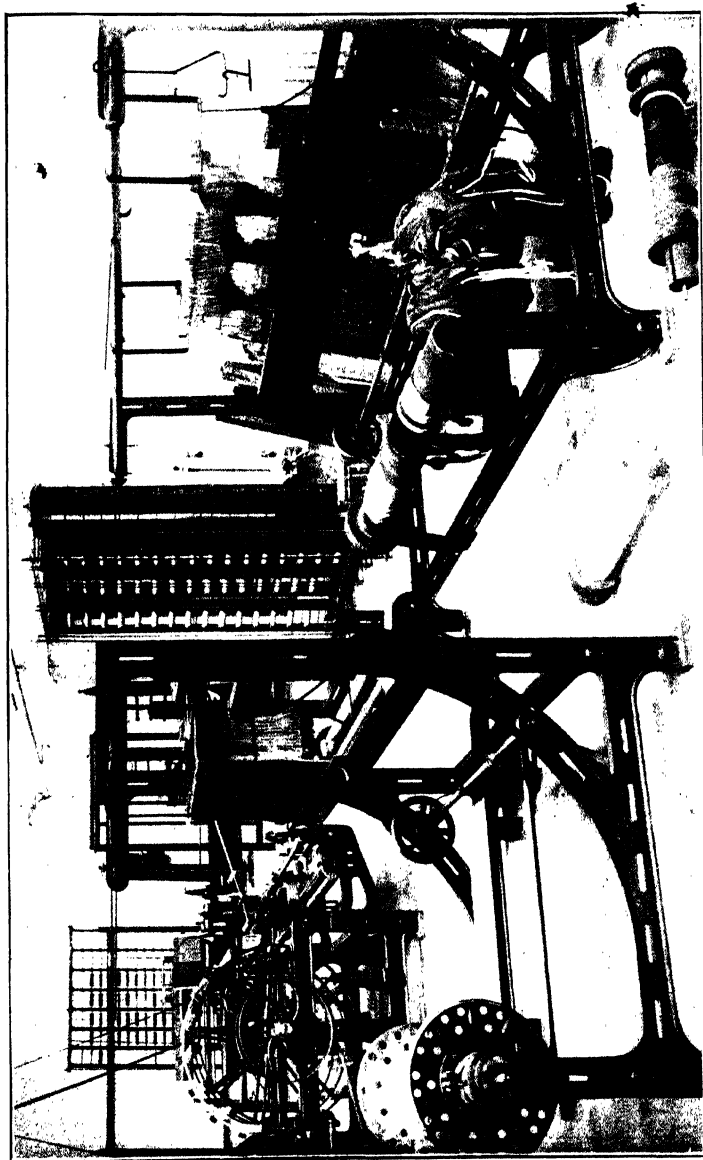


Fig. 4.—Warping and Dressing.
City of Bradford Technical College.

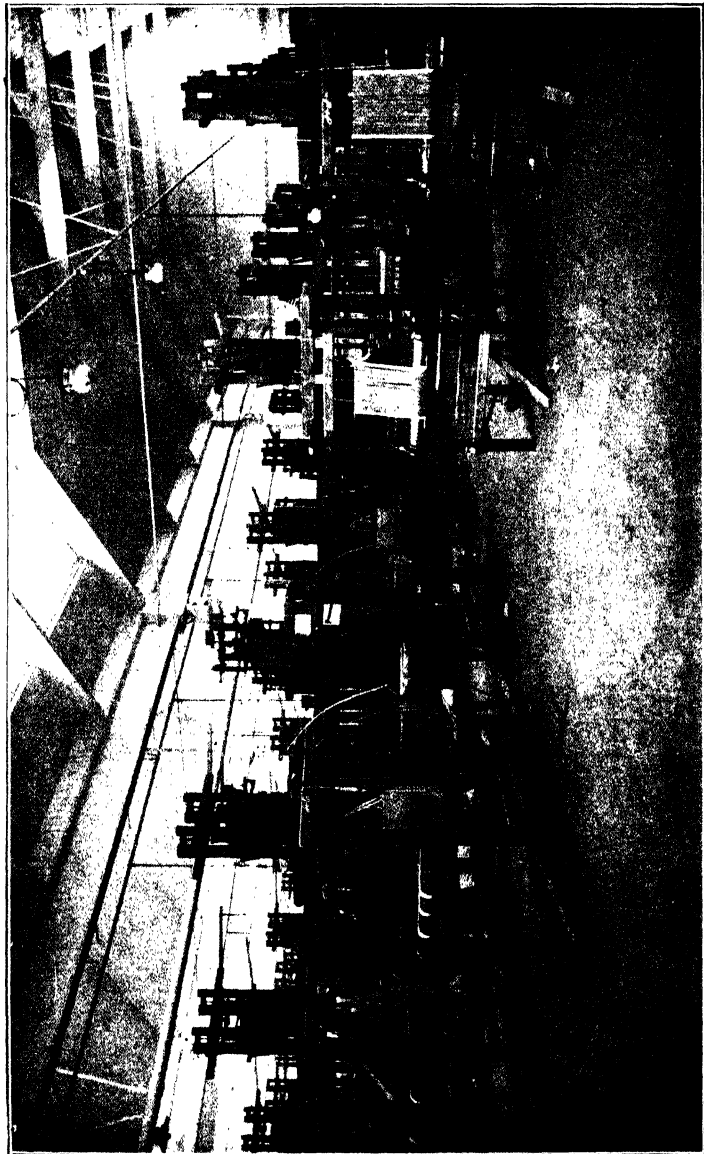


Fig. 5.—Hand Loom Equipment.
South of Scotland Central Technical College.

With so many technical institutions in other countries and so

**The Need of
Textile Schools
in Ireland.**

much attention devoted to technical education, it is surely time a definite effort were made to provide at least one Central Institution on similar lines in this country (Ireland), preferably in Cork, which may be regarded as the chief woollen centre. For the past few years instruction in Woollen Manufacture has, to a certain extent, been provided at the Municipal Technical Institute Belfast, but so far the work has been carried on chiefly in the evenings.

The Textile Department of this excellent Institution is mainly devoted to the technical side of linen manufacture, and is not adequately equipped for woollen work,—preparing, spinning or finishing machinery not being provided. It is to be hoped that the woollen classes will be continued, and the equipment added to, though it is doubtful if a linen centre so far removed from the main trade area would be the best location for a Central Woollen School.

If the needs of the industry are to be adequately met, full technical courses must be provided for—

- I.—The Operative,
- II.—The Designer and the Higher Official.
- III.—The Master and the Manager.

It is in dealing with Class I. that most difficulty will probably be experienced. It will obviously be impossible
The Curriculum of from the scattered nature of the industry to
a Textile School. assemble sorters, carders, weavers, tacklers, spinners, finishers, etc., at a Central Technical Institution, and it will be necessary to provide suitable classes for those in the immediate environment of the factory, and decentralised instruction, if necessary, in the factory itself, for operatives less favourably situated. Special grants to students for travelling expenses have been found of assistance in connection with the Scotch Schools, and no doubt a similar system could be judiciously employed here.

Another difficulty will be the lack of such preliminary general instruction as would enable the students to take full advantage of technical training, and it may be necessary to provide this before serious advance is made on the technical side. Suitable Technical Instruction for this class should be of distinct value in helping the factories to obtain well trained “hands,” the scarcity of whom has long been a serious drawback.

With regard to the training desirable for Class II. a leading

English manufacturer has expressed the view that a twelve months' day course, followed by systematic evening classes for say two years, would cover the average requirements. If exception is made for designers, who should undoubtedly have a full three years' day course, this should on the whole be satisfactory.

For Class III. a three years' systematic day course is the minimum that should be considered satisfactory.

Without attempting to touch on the purely professional side of the training for Classes II. and III. which is now standardised in the best schools, a strong plea might be made for the inclusion of Machine Construction and Drawing, and Systematic Engineering in these courses, and of Factory Organisation in the case of Class III. The General Engineering Course should cover the elements of Mechanism, the principles underlying modern prime movers, the lay-out of shafting and machinery, and modern methods of power transmission. The elementary principles of electrical machines should also be included, while if at all possible, a twelve months' apprenticeship should be served by Class III. in an engineering works, preferably an electrical engineering works, where all the necessary knowledge of machines could be gained, and in addition, something learned of electrical practice.

By Factory Organisation is not meant the present organisation of a Woollen Factory, which—in its essentials at any rate—a smart man can master in the factory in a few weeks, but the science of factory or workshop management which has reached a very high stage of development in America. Originally applied to Engineering workshops, it met with such astonishing success that it was rapidly extended to other industries. Its practice has since become a regular profession, and it has been introduced into a number of workshops in England. Such a course would include charts and particulars of the factory organisation of each of the Textile Trades, both at home and abroad, and of selected trades other than Textile, from which something might be learned.

It has long been pointed out by Principals of Technical Schools that day classes are not used to full advantage by students, while the evening class accommodation often barely meets the demand. The average evening student can only devote to his work from 20 to 25 per cent. of the time a day student has available. It is not easy to see therefore, how evening work can satisfactorily replace day work for those intending to be designers, managers or masters, while further, the evening student frequently goes to his work fatigued, and the artificial light by

TECHNICAL EDUCATION AND THE IRISH WOOLLEN TRADE.



Fig. 7.—Cloth Finishing (Scouring, Milling, and Steaming).

University of Leeds.

TECHNICAL EDUCATION AND THE IRISH WOOLLEN TRADE.

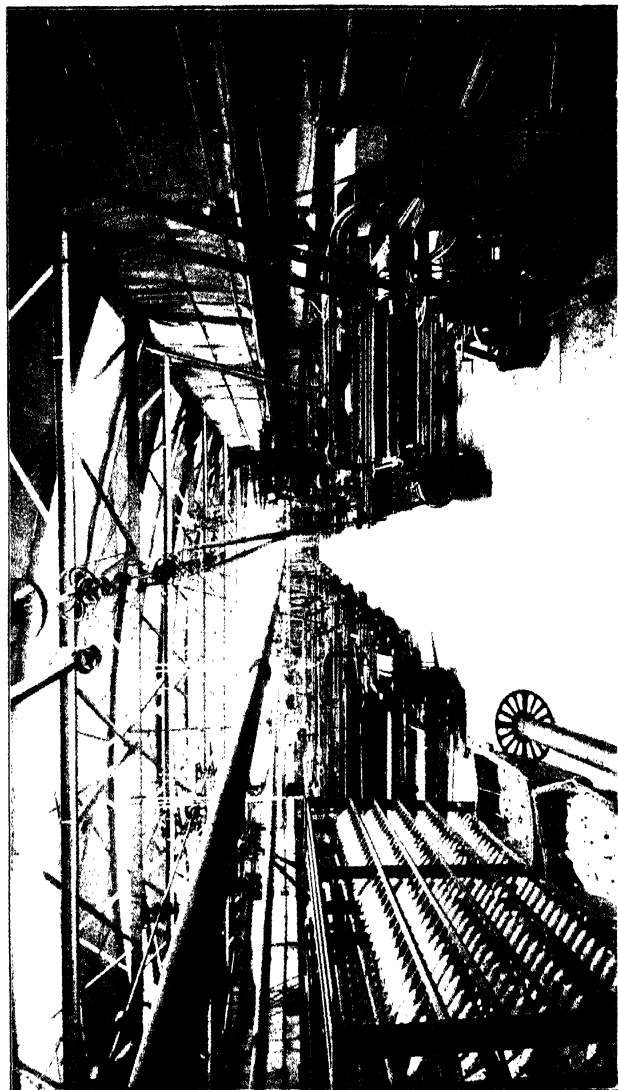


Fig. 6.—Power Loom Equipment.

Preussische Höhere Fachschule für Textilindustrie in Aachen.

TECHNICAL EDUCATION AND THE IRISH WOOLLEN TRADE.

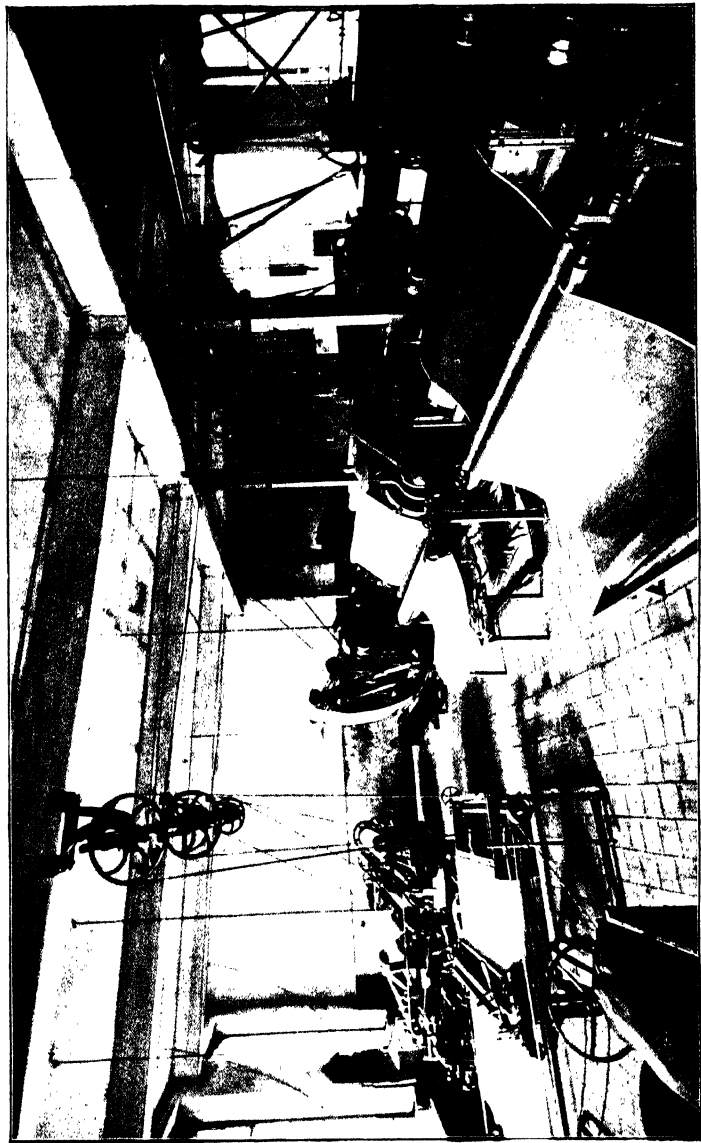


Fig. 8.—Cloth Finishing (Raising, Brushing, Cutting and Pressing).
Preussische Höhere Fachschule für Textilindustrie in Aachen.

TECHNICAL EDUCATION AND THE IRISH WOOLLEN TRADE.



Fig. 9.—Dyehouse.
City of Bradford Technical College.

which he works is unsuitable for colour work. Practical work in the factory is essential to the thorough grasping of the instruction given in the school, and it is probable that the student finding the time taken prohibitive, if the practical and the theoretical courses are taken consecutively, attempts to reach the desired goal in shorter time by taking them concurrently. Another cause for complaint is that many masters and managers are not sympathetically disposed towards technical graduates, and difficulty has been experienced in inducing students to take technical courses because of the consequent low market value of their training. The trouble appears to arise from the fact that technical courses have been more generously provided for the rank and file and more largely availed of by them, while the employer of labour who has had no special textile training fails, of course, to properly appreciate its value in those under him. This view of the difficulty is confirmed by a paper* recently read by Mr. Oscar Hall, of Bury, in which he endeavoured to show that in the textile trades, and from the point of view of technical training, the British workman is superior to the German workman, but the British employer inferior to the German employer.

The technical school can have advantages to an industrial community other than those that arise from the courses of instruction it provides. Its machine equipment should be of the most comprehensive type it is possible to obtain, several examples of individual machines being provided when different makers embody distinctive features. Some of the machines can be obtained free from the makers, and the bulk of them at considerably below cost price, and if suitable attention is devoted to it, this side of the equipment will form a perpetual exhibition of the best the textile machine-maker can show.

As a convenient source of information in practical difficulty a school is invaluable to the manufacturer, and experiments can be made there that if carried out in the factory would seriously interfere with commercial work.

To provide them with new ideas and keep them in touch with the latest developments abroad, most English and Scotch Schools take the commendable course of periodically giving their teachers facilities for travelling and investigating foreign trade and factory conditions. A good up-to-date school controlled by a capable teaching staff has been described by Dr. Oliver, the Principal of the South of Scotland College, as "the source from which initial inspiration is drawn and a centre of enlightenment for the district."

As illustrating some of the developments that have taken place in recent years in textile work, it may not be out of place to touch on some applications of **Developments In Textile Machinery.** electricity. When electrical engineers first faced the problem of providing power for textile factories, as in the case of most new applications, they did not at first depart far from the existing order of things. Power had, by means of the fine work of the old mill-wrights, been transmitted from one prime mover to all the machines, and the electrical engineer merely replaced the prime mover by a motor, the mill-wrighting remaining as before. Later he placed a number of large motors in each mill, doing away with a number of complicated drives. Later still he replaced the large motors with smaller ones, splitting up the drives still more, and reducing transmission losses and speed variation. To-day he fits single motors to each of a number of machines, as for instance, looms, mules, ring-, flyer-, and cap-frames, hydro-extractors, etc., and by this means not only does he reduce power consumption to a remarkable extent, but he increases the production of the machines in some cases as much as 20 per cent.

Proprietors of Jacquard looms know how expensive cards are, the space they occupy on the loom, and the difficulty of storing them. The electrical Jacquard which replaces the whole complicated system by a single composite plate easily duplicated, has now reached such a state of perfection, that after exhaustive experiments, an important firm is equipping a large percentage of its looms, and the system bids fair to eventually altogether displace the present arrangement. The problem of matching colours by artificial light has long occupied the attention of illuminating engineers. The effect of artificial light in colour matching is well known; less known perhaps are the changes that occur in daylight from hour to hour, and from day to day. Light screens have now been designed which, interposed between a source of light, such as incandescent electric lamps, and the material, give without change, the effect of normal daylight. A further advance has also been made in that after many hundreds of experiments, a glass has been produced from which incandescent electric lamp bulbs are made, with the result that light which approximates in colour effect to normal daylight can be produced by merely replacing existing lamps by the new ones referred to.

Electricity also finds other and minor applications, as an auxiliary in the automatic loom, and for warp stop motions, etc.

Useful as electricity is in the factory, its presence under certain circumstances is by no means beneficial. It has been known for many years that the friction between the raw material and rollers,

TECHNICAL EDUCATION AND THE IRISH WOOLLEN TRADE.



Fig. 10.—The Individual Electric Driving of Woollen Mules.

TECHNICAL EDUCATION AND THE IRISH WOOLLEN TRADE.

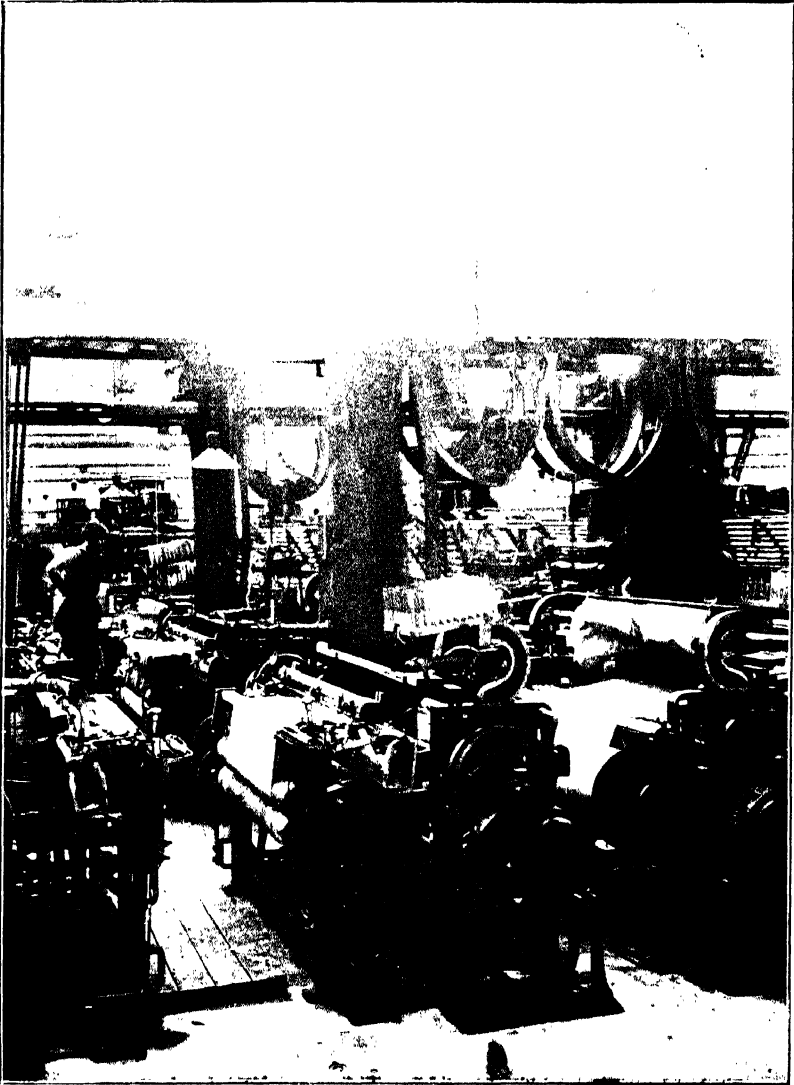


Fig. 11.—The Individual Electric Driving of 108 Worsted Looms.
Yorkshire.

etc., in its passage through preparing machines, such as cards, generates static electricity. Its effects are the flying apart of the charged threads or "slubbing," causing entanglement and breakage. The effects are most troublesome on a dry day, in fact when the conditions are such as to favour the production of static electricity with frictional machines in the Laboratory. The results are so serious that the production of the machines affected is frequently reduced more than 50 per cent., and the production of the machines that follow, such as the mule, is also affected.

Until recently there was no practical remedy, though as a precautionary measure, the carding machines were sometimes placed in a cellar. One particularly large manufacturer informed the author that he had changed one machine into no less than six different rooms, finally obtaining some slight improvement. This may be considered a very unscientific method of attacking such a difficulty, but it must be remembered that the problem is by no means as simple as would at first sight appear, and that no ordinary method of discharge is applicable.

In conclusion, and in touching on the future of the industry it may be well to point out what an eminently desirable one it is to develop, and how suited **The Woollen Industry suited to Ireland.** to our people. Board of Trade returns show that men and women are fairly equally employed. The trade is a clean one, and work is carried on under congenial conditions, at normal temperatures, in a non-humid atmosphere. It is an artistic trade, and tends to develop the artistic taste of the operatives. Again the power required to run a factory of competitive size, is considerably smaller than is the case in any of the other large textile trades. This is due to the high selling price of the finished cloth, and to the low load factor in the Mills, many machines being shut down at a given instant. This is important, as Ireland is not favourably situated as regards cheap power. On the other hand it must not be taken that because power costs are higher here than in England and Scotland there should therefore be serious difficulty in competing. Figures taken from the balance sheet of a large Yorkshire mill show that an increase of 8 per cent. in cost of power and heating is balanced by a saving of 1 per cent. in cost of raw material, while a 6 per cent. increase is balanced by a saving of 1 per cent. in wages. We are in a favourable position for obtaining raw material cheap, since we produce a certain percentage of our requirements, and we are in a very good position as regards cheap labour. This was very clearly shown by the Earnings and Hours inquiry of 1886, and though the Irish figures are not given separately in the 1906

report, there is no reason to suppose that our advantage has disappeared.

If reasonable effort is made, therefore, to develop the trade, there is every prospect of its meeting with success. The tendency of factories to congregate in particular districts or trade centres should be encouraged; it facilitates teaching, and promotes healthy rivalry, but more than anything else it tends to produce an industrial spirit among the people which should lead in the end to what has been so well described as "hereditary specialization."

The quality of our wool, which has been seriously affected by the increase in the number of small holdings, should receive attention.

Finally it might be pointed out that if cheap electrical power, developed in central stations, were distributed in the industrial areas the capital required for the starting of factories would be considerably reduced. In England and Scotland it is possible to start manufacturing with small capital outlay, because of the advantages offered by "Room and Power" schemes. These schemes have been developed to such an extent in the cotton trade that buildings are erected and driving plant installed by syndicates with the express object of the whole being let to intending manufacturers at a yearly rental. Textile machinery also is hired out in many cases, and the advantages offered by such a system are obviously very great. The nearest approach we can hope to make to it in this country (Ireland) is in the provision and distribution of power, and from the point of view of industrial development generally, this question is of the utmost importance, and might well form the subject of inquiry by a Royal Commission.

The author wishes to acknowledge his indebtedness to the authorities of the various Colleges and to Messrs. Siemens for the loan of blocks and photographs illustrating plant, and to Principal Reynolds and Herr Direktor Hirschberg for information regarding the German Schools.

FOURTEENTH YEAR OF THE SUMMER COURSES FOR TEACHERS.*

Address by MR. T. P. GILL, Secretary of the Department.

The Summer Courses for Teachers were opened at the Royal College of Science on July 7th. Over 500 students from all parts of Ireland attended for courses of instruction.

The following were amongst those present :—Mr. T. P. Gill, Secretary, Department of Agriculture and Technical Instruction ; Mr. G. Fletcher, F.G.S., Assistant Secretary in respect of Technical Instruction ; Professor Cole, F.G.S., Dean of Faculty of the College ; Professor Brown, B.Sc., M.I.E.E. ; Professor Jeffcott, B.A.I., M.I.M.E. ; D. Houston, F.L.S. ; F. E. Hackett, M.A., M.Sc., Ph.D. ; A. Williamson M.A. ; G. E. Armstrong, M.Sc., ; A. O'Farrelly, M.A. ; J. H. Pollok, D.Sc. ; W. J. Lyons, B.A., A.R.C.Sc.Lond. ; J. A. Clarke, B.A., M.B. ; R. G. Allen, B.Sc., A.R.C.Sc.I. ; G. A. Watson, A.R.C.Sc.I. ; A. G. G. Leonard, B.Sc., A.R.C.Sc.I. ; P. F. Gillies, B.Sc. ; Mrs. Ella Webb, M.D. ; Miss Marion Andrews, M.D. ; Messrs. G. J. T. Clappett, H. O. Armstrong, E. Daly, J. Edwards, W. Davidson, A. Kelly, J. D. Walsh, and the Registrar of the College (Mr. P. A. E. Dowling).

The majority of the above-named are instructors in charge of the different courses being held in the College.

Mr. GILL, in welcoming the students on behalf of the Department, said :—

Ladies and gentlemen, every year for the past fourteen years, since these summer courses were inaugurated, it has been customary for someone representing the Department to give a greeting on the opening day to the teachers who come up to attend them. It is now again my pleasing duty, as it has so often been before, to bid you welcome most heartily on behalf of the Department ; and I repeat, as I have often done, that it is a bright omen for Irish education to see so many teachers year after year willing to give up the greater part of their vacation time in order to fit themselves the better for the great national work which is entrusted to them. This sacrifice, for it is a sacrifice, and the unflagging enthusiasm which have been shown by the teachers throughout these courses have every year been to me one of the most encouraging and stimulating parts of my experience as an educational worker.

THE WORK OF THE SUMMER COURSES.

I do not think many people outside the schools have any idea of what these summer courses mean. The work has been done very

* For full details of the courses see "Official Documents" at end of JOURNAL.

quietly. This is now its fourteenth year, and as we have reached such a degree of maturity and as it is at, perhaps, an interesting stage in its development, it may interest you and others if I mention a few facts concerning it. You are aware that when we started the summer courses first it was with the object of training year by year for a series of years a number of teachers for the new educational developments which we were introducing, especially in the secondary schools. It was our view that when we had got a certain number of teachers trained by these means and when the scheme for regularly training them in the colleges and universities was properly established, the need for summer courses would diminish. But as a matter of fact the demand for them became so great as the years went on and their utility came to be demonstrated in so many ways and to find so many opportunities, that we have at length had to regard them as a regular established institution.

Now, do you know the number of teachers that will be in Dublin attending these courses this year? Including the courses in Rural Science and School Gardening, there will be here in Dublin during the next few weeks 534 teachers attending these courses. But we have summer courses going on not merely in Dublin but in other parts of the country as well, in certain convents and in the Technical Institute in Belfast, for instance. If we include these, the teachers attending the Department's summer courses this year will make a total of 712. In the fourteen years I find that there were nearly 9,000 admissions to these summer courses, and that nearly 3,000 individual teachers, each of them coming up on an average for a series of 3 years, passed through them.

EDUCATIONAL CO-ORDINATION.

These teachers are of different kinds and the courses are of different kinds. Teachers for Intermediate schools come to get trained for the different branches of the Programme of Experimental Science, Drawing, Manual Instruction, or Domestic Economy as the case may be. The greater number belong to this category, and their special subjects, as you know, include chemistry, physics, natural history, chemical and physical geography and so forth. There are also teachers for National Schools. For these we have, in co-operation with the National Board, been doing some very special work of late in training them for the teaching of Rural Science and School Gardening. The National Board selects these teachers and we, at the Royal College of Science, the Albert Agricultural College and elsewhere, give them a very thorough and interesting course in this fascinating and valuable branch of teaching. A considerable number of national school teachers attend another important course. This is a course intended to equip them for giving the special type of preparatory instruction which we find it necessary to provide

in our technical schools for a great number of the students who come there unable to follow with profit the technical teaching owing to having forgotten so much of what they had previously learned at school. Our technical committees employ national school teachers largely for this purpose, and the summer course I speak of is an outcome of our experience in tackling the problem presented by these students. You will see in these arrangements, by the way, an example of co-ordination in educational work. We are training teachers for secondary schools and for primary schools side by side with the training we are doing for teachers of technical and agricultural schools, and the three educational authorities, the Intermediate Board, the National Board and this Department, are working in the closest understanding and co-operation upon the matter. Many people I fancy would be surprised if they knew how much of this collaboration was going on and in all sorts of ways besides those I am referring to. I can tell you that of recent years a growing unity of idea and purpose has been got into Irish education and is steadily advancing there—an organic sense of unity which, even such as it is, some countries cannot surpass and which is moving surely and naturally towards the right goal. It is worth mentioning too that all parts of the country are represented here in this national work. The student-teachers come from all directions and all types of schools, and for our teaching staff, which includes professors of the College of Science and other central institutions, we fetch leading men engaged upon our work from such diverse centres of Irish life as Belfast, Londonderry, Kildare, Tralee, Ballymena, and Portadown.

Besides courses for secondary and national school teachers our summer courses include a scheme of advanced and special training for various types of our teachers in technical schools and classes. For example, there are advanced courses for our Manual Instructors in practical mathematics and mechanics, handrailing and metalwork. Manual Instruction, I am glad to say, is going to receive a great advance in our educational system next year, and our aim is to have our teachers so trained as to be able to handle that fine subject in as broad and educational a spirit as possible. Similarly we have advanced courses for our Domestic Economy teachers which include, amongst other subjects, such as advanced dressmaking, a course in hygiene and sick-nursing. An important series of courses is carried on in the Metropolitan School of Art for teachers in schools of art and art classes. We have a course in office routine and business methods and a course for teachers of introductory English and mathematics in technical schools.

“SPECIAL” COURSES.

One of our aims is to keep our teachers abreast of new developments in their subjects. Thus under the head of art this year

we introduce a special course upon lithography. The art of lithography as it happens is experiencing a revival. Some new inventions in America have opened out a fresh field of opportunity to this art, the art of drawing upon and printing from stone, which had gone somewhat out of fashion. It now seems likely to replace process work in many branches and it has special attractions for the black and white artist. Now, the best authority in these kingdoms upon lithography, the best lithographic artist and teacher beyond all comparison and by common consent, is Mr. Ernest Jackson of the Central School of Arts and Crafts in London ; and we have asked Mr. Jackson, and he has kindly agreed, to come over to Dublin, and during the next few weeks he will be teaching all the new features of this subject in our School of Art in Kildare Street. Another special course in an artistic craft is one on coloured embroidery which will be given by Miss Atkinson of Belfast, and we have a very distinguished teacher, Mr. Fenn of Goldsmith's College, London, giving a course in applied design. A special course in applied science will be one in chemical manufactures given by Dr. Pollok of the Royal College of Science and his assistants. Let me add that in the Industrial Annexe on the canal bank there will be courses for teachers of lacemaking, crochet work and sprigging. Many of these teachers are working in the congested districts under schemes of the Congested Districts Board, so that you see another point of co-ordination there. Besides this series of regular courses we generally have each year two or three lectures for the benefit of all the students given by some eminent man upon a subject which he has made his own. This year we have invited a distinguished Irishman in England, Mr. Catterson Smith, Head of the Birmingham School of Art, and brother of our late distinguished fellow citizen Mr. Catterson Smith of the Royal Hibernian Academy, to come to Dublin and give three lectures upon a feature of art teaching in which he has become famous. I mean memory drawing. All our art teachers will have heard of Mr. Smith's work in this line, and they will be able to form an opinion themselves at first hand and with the evidence of the man himself of its merits.

I think from what I have said, though I have by no means covered the whole ground, you will have some general idea of what these summer courses signify and how wide and varied is their reach. I now bid you and your professors and teachers good luck in the task which you are beginning this morning, and I think you may feel assured that it is one of precious utility for yourselves and for the Irish people.

THE SPREAD OF THE CELERY LEAF-SPOT DISEASE BY THE USE OF AFFECTED SEED AND ITS PREVENTION.

An illustrated account of the Celery Leaf-Spot Disease appeared in the issue of the JOURNAL published in April last, and has since been issued as one of the Department's Leaflets—No. 5.

The disease is caused by a parasitic fungus to which the name *Septoria Petroselini* var. *Apii* has been given. This fungus occurs not only on celery but also on parsley (although in this country apparently but rarely on the latter) and has been known for nearly three-quarters of a century. It is,

however, only within the past twenty years or so that it has become recognised as the cause of serious disease in celery in various parts of Europe and America; and careful study of the disease on the part of plant pathologists is of still more recent date.

The earliest detailed account of the disease and of the organism causing it is to be found in Klebahn's paper* published in 1910, and others have been published more recently by Chittenden† and Salmon‡. Klebahn specially mentions and figures the presence of the spore-containing fructifications (*pycnidia*) of the fungus on the seeds§ and he proved that the spores obtained by washing such affected seeds with water, were capable, when sprayed over healthy plants, of reproducing the disease. He did not, however, succeed in obtaining diseased plants by raising seedlings in soil from affected seeds although he concludes that the disease may be contracted and is spread in this manner. In a later publication|| he recommends treating affected seed with copper sulphate solution in order to prevent the disease.

Although from Klebahn's work there was every probability that the disease was transmissible by means of affected seeds, actual proof of such transmission was lacking, and in view of the practical importance of the matter it seemed very desirable to adduce such proof if possible. Further, if it be so it is important to know some satisfactory method of treating affected seed so as to render it safe for use.

* Klebahn H., Krankheiten des Selleries. Zeitschr. f. Pflanzenkrankh. 20. 1910. p. 1.

† Chittenden, F. J., Leaf Spot of Celery, Journ. R. Hort. Soc. 37. Part 1 1911. p. 115.

‡ Salmon, E. S., Celery "Blight" or "Rust." Gard. Chron., June 21 and July 5, 1913, p. 414 and p. 3.

§ Strictly speaking, of course, the so-called seed of Celery, as of other Umbellifers, is a half-fruit or *mericarp*.

|| Klebahn H., Untersuchungen über die Selleriekrankheiten und Versuche zur Bekämpfung derselben. Mitt. d. Deut. Landw. Gesellsch. Stück 6. 1911.

Acting on the advice of the Department, who recently circularised them on the matter, a considerable number of Irish seed merchants submitted samples of celery seed for expert examination. This was carried out in the Seeds and Plant Disease Division and thus a favourable opportunity presented itself for initiating experimental investigations into the two points mentioned.

Altogether one hundred and nine samples of celery seed (including practically all the common varieties as well as one of *celeriac*) have been examined for the presence or absence of the fungus; and it was found to be present in one hundred (or practically ninety-two per cent.) of them. The samples came partly, as stated, from Irish seed merchants, but partly also from gardeners or private individuals, and a considerable number of them were purchased direct from English seed-houses. Of the nine samples free from the fungus one came from an Irish gardener, six from Irish and the remaining two from English seed firms.

In order to illustrate the thoroughness with which the examinations were made it may not be superfluous to give the details of the processes employed, particularly as some samples were received which contained affected seeds in spite of assurances to the contrary.

Each sample was first critically examined under a simple microscope and seeds appearing to have the characteristic blackish pycnidia on them were sought for and if found removed. The recognition of the pycnidia is facilitated by moistening the seeds with water, when they stand out more clearly. It may be stated that every blackish looking object on the surface of the seed is not necessarily a pycnidium of the celery *Septoria*, and in one case the perithecial form of an asclegerous fungus was obtained, which, however, was not identified.

One or more of the suspected seeds was then dissected or macerated so as to partially free the pycnidia from the substratum and these were then examined under the low and high powers of a compound microscope. Fresh material containing pycnidia from affected foliage was at hand for purposes of comparison and from time to time measurements of the spores were made as a check.

Finally, portions of each sample were allowed to stand for a short time in water and, after thorough shaking, drops of the water were examined under the compound microscope for the presence or absence of the characteristic spores of the fungus. In each of the one hundred cases mentioned positive results, and in each of the nine cases negative results were obtained after examination by the three methods described. Great care was taken to see that all the apparatus used was quite clean, and the instruments used for dissection were cleaned and heated to redness before being used for succeeding samples.

It is therefore quite clear that a very large proportion of the

celery seed on the market at present carries the fungus with it. It does not, however, *necessarily* follow that every sample containing affected seeds will give rise to diseased plants, for either the seed or the fungus or both may be dead, or suitable conditions for infection may not occur.

One hundred and one of the samples were submitted to germination tests, the remaining eight not being tested either because the sample had to be returned or because sufficient seed for a test did not remain after the examination for the presence or absence of the fungus.

The results show extraordinary variations. In two cases the germination was only one per cent. In seventeen cases the germination was 25 per cent. or under, in forty-two between 26 per cent. and 50 per cent., and in thirty-one cases between 51 per cent. and 75 per cent. The best sample germinated 96 per cent., two others gave 92 per cent. and 91 per cent. respectively, while eight germinated between 89 per cent. and 76 per cent. The average percentage of germination of the whole 101 samples was only 49 per cent.

The first trial to obtain diseased seedlings by sowing affected seeds gave a negative result, and on seeking for an explanation of this it was found that although the seeds used bore the pycnidia of the fungus in abundance yet the spores in them had lost their power of germination and were dead.

An investigation was then made of each of the remaining available samples of affected seed, ninety-six in all, to ascertain whether the spores were still alive or not. This was done by preparing hanging drop cultures from water in which portions of the affected samples of seed were washed, and keeping them under observation for a few days under the microscope. In order to be certain that the washings contained not only superficial spores but also spores from the interior of the pycnidia, some of the affected seeds in each case were bruised in order that the latter might be liberated. Controls were also made at the same time with spores which had previously been proved to be capable of germination in order to be certain that the conditions under which the tests were carried out were correct.

As a result it was found that in only fourteen cases (one of which was celeriac seed) were spores capable of germination present. The germination of the seeds of these samples varied from 29 to 88 per cent. and the presence of the fungus with living spores was not at all clearly associated with a high percentage of seed germination, on the contrary the spores were dead in the majority of cases where the seed germination was particularly good. If, as is usually the case,

poor germination is associated with old seed and *vice versa* it can scarcely be maintained that the spores were dead in so many cases because the seed was old.

It may be noted, in passing, that it does not necessarily follow that because the spores were dead the fungus also was dead. It is possible that the fungus was still alive in some or even all of the cases where the spores were dead and that its mycelium might have produced fresh pycnidia and spores under suitable conditions of temperature and moisture or that the pycnidia already present on the seeds might under such conditions have produced a fresh batch of living spores. At least one case of this kind has been described, but in the present investigation the point was not pursued.

A second trial to obtain diseased seedlings was then made with seed bearing the fungus, the spores of which were proved to be alive and capable of germination. The seeds were sown in nine inch pans of finely sifted virgin potting loam lightened by the addition of silver sand, one hundred being sown in each pan. Controls consisting of seeds from which the fungus was proved to be absent were grown in the same soil under identical conditions. Sterilised soil was avoided because the experience of former years had shown that seedlings are frequently much retarded in their growth or even killed by the use of certain soils soon after sterilisation. The seedlings were raised in a greenhouse and it is to be noted that the seeds were sown very much more thinly than is customary in gardening practice.

The result was that from the controls no diseased plants were obtained while from the affected seed a considerable number of diseased seedlings arose. It was not difficult to see how the infection occurred. A great many of the germinating seedlings pushed up the empty seed coat on the tips of their seed-leaves or cotyledons, and even when these expanded it remained fixed for a considerable time to the apex of one of them. Condensed moisture or the water from the fine rose with which the seedlings were watered would be quite capable of washing the spores after extrusion from the pycnidia on to the cotyledon. It was the cotyledons of the seedlings which became attacked, and a seedling showing one of its cotyledons with the fungus pycnidia on it is illustrated in the accompanying photographic reproduction. When once attacked the cotyledon soon shows a brown spot on which pycnidia rapidly develop and before long the whole cotyledon becomes killed and often falls off. It is easy to see that if, as in ordinary practice, the seedlings were raised in very close proximity to one another many of them which would otherwise be healthy would contract the disease by contact with their affected neighbours.

There is therefore no longer any doubt but that affected celery

CELERY LEAF-SPOT DISEASE.

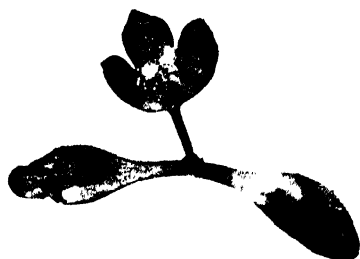


Fig. 1. —A diseased celery seedling raised from an affected seed. The right-hand seed-leaf or cotyledon and the first ordinary leaf (partially divided into three), are both healthy, but the left-hand seed-leaf is somewhat shrivelled at its free end, and on it can be seen the minute fructifications of the fungus causing the Leaf-Spot disease. The seed coat from which infection occurred has fallen off. (Slightly enlarged.)

seed can and does give rise to diseased seedlings*, nor can it be doubtful that this mode of transmission of the disease frequently occurs in actual practice; and in spite of the fact that affected seed may not at times produce diseased seedlings either because the spores are dead or for some other reason, celery growers are still urged to take the precaution of demanding from seed suppliers celery seed which is entirely free from the fungus.

Since, however, there may be difficulty in obtaining such seed it seemed worth while to endeavour to find some means of treating affected seed so as to kill the fungus without impairing the vitality of the seed itself, and this has now been done. Various chemical and physical means have been employed from time to time for the purpose of rendering seeds free from fungi and bacteria but it would be going too far to discuss them in detail here. It has already been stated that Klebahn recommended steeping in a solution of copper sulphate, but the two most promising liquids which suggested themselves for steeping purposes were formaldehyde (a proprietary brand of which called Formalin is well known) and hydrogen peroxide (sold by chemists sometimes under the name of "Golden Hair Wash.") Preliminary experiments showed that hydrogen peroxide either 10 or 20 vols. and dilute formalin, 1 (of 40 per cent.) in 600 of water, were both capable of killing the spores of the fungus in a short time.

A further preliminary experiment was then carried out to ascertain what effect treatment with these two solutions would have on the germination of the seed, and the following table gives a summary of the methods of treatment and the results obtained, including one test of Klebahn's copper sulphate treatment.

* Mr. F. J. Chittenden of the Royal Horticultural Society's Gardens, Wisley, announced at a meeting of the Association of Economic Biologists in April last that he had succeeded in proving the same thing.

[TABLE.

No.	Treatment.	Per cent. of Germination.
1	Dry seeds tested for germination in ordinary way.	58
2	Dry seeds soaked 3 hours in water	56
3	Dry seeds soaked 3 hours in hydrogen peroxide .	63
4	Dry seeds soaked in 1 part formalin (40 per cent.) in 600 water.	68
5	Dry seeds soaked one hour in water and for a further 3 hours in water.	54
6	Dry seeds soaked one hour in water followed by 3 hours in hydrogen peroxide.	61
7	Dry seeds soaked one hour in water followed by 3 hours in 1 part formalin (40 per cent.) in 600 water.	59
8	Dry seeds soaked 24 hours in 2 per cent. Copper Sulphate Solution, washed in lime water and dried on blotting paper. (Klebahn's method).	35

The seeds were placed in small corked glass tubes with the various liquids and were thoroughly shaken from time to time to ensure thorough wetting. After treatment and before being placed in germination dishes they were drained for a short time on filter paper and became practically air dry.

It will be observed that the treatment with copper sulphate caused a serious decline in the percentage of germination, but in the case of the other liquids the effect was practically nil. Little importance need be attached to the differences in percentage of germination in the first seven cases, for a variation of from nine to ten per cent. is not unusual in the case of successive tests of samples of seeds about half of which are dead.

Seeds bearing the fungus with living spores were then subjected to the above mode of treatment and one hundred of them were subsequently sown in each case, the seedlings being raised in the

manner previously described. The following table gives a summary of the results.

No.	Treatment.	No. of Plants after 41 days.	
		Healthy.	Diseased.
1	None	40	3
2	3 hours in water	75	4
3	3 hours in H_2O_2	29	0
4	3 hours in formalin	57	0
5	4 hours in water.	68	6
6	1 hour water, 3 hours H_2O_2	89	0
7	1 hour water, 3 hours formalin	38	0
8	24 hours $CuSO_4$, washed in lime water	1	0

It will be observed that in each case where no fungicide was used some diseased seedlings resulted and that all three of the chemicals used resulted in a total suppression of the disease. The copper sulphate treatment, however, played such havoc with the seeds and the seedlings (several were observed without roots which quickly died off) that its use cannot possibly be regarded as safe.

It might be contended that since the percentage of diseased seedlings arising from affected seeds is comparatively small the risk of using such seed untreated is but slight. This, however, is not the case for had the seed been sown very thickly as is commonly done in practice it is almost certain that the percentage of diseased seedlings would have been greater. Further, the presence of even a single diseased seedling in the seed bed furnishes a source of infection from which ultimately the whole crop may become affected.

In the experiments just described the seeds were sown almost directly after the treatment was over, being merely drained on filter paper and allowed to become more or less air dry. Whether such treated seed would keep in good condition for a considerable period after treatment and subsequent drying is another question to which the exigencies of time have not yet rendered a complete answer possible. As a partial answer, however, the following experiment may perhaps serve.

Portions of a sample were treated in the same way as described for Nos. 2, 3 and 4 in the two preceding tables, they were then

drained on filter paper, allowed to become thoroughly air dry and finally stored in corked glass sample tubes. Eight weeks after treatment they were tested for germination and at the same time a portion of the original sample, untreated, was similarly tested. The results were as follows :—

No.	Treatment	Germination per cent.
1	Untreated	92
2	3 Hours in Water	95
3	3 Hours in H ₂ O ₂	94
4	3 Hours in Formalin	89

From this it will be seen that a sample of celery seed, having a good germination capacity, does not become adversely affected by the methods of treatment described, or alter its characteristics in this respect to any appreciable extent after careful drying and proper storage, within a period of two months. It does not follow, however, that seed of inferior germination capacity would behave in the same way.

Summarising the results of the investigations then it may be stated that it has been proved definitely and clearly that the Celery Leaf Spot Disease can be contracted and propagated by the use of affected seed bearing the fungus in a living state upon it. Further that such seed may be rendered innocuous by means of suitable treatment without injury to the seed itself. It is not claimed that the methods of treatment described are the only ones likely to be available or that finality in the matter of the exact details of such treatment has necessarily been reached, but the experiments described certainly form a definite basis upon which a successful method of treatment may be worked out.

The greater part of the experimental work done in connection with the present investigation was carried out by Miss R. Hensman, Mr. H. A. Lafferty, and other members of the Staff of the Seeds and Plant Diseases Division, to all of whom I desire to express my thanks for their valued assistance.

GEORGE H. PETHYBRIDGE.

THE PROBLEM OF SMALL INDUSTRIES WITH SPECIAL REFERENCE TO MA- CHINE EMBROIDERY.

[*A paper read before the Thirteenth Annual Congress of the Technical Instruction Association by* GEORGE FLETCHER, F.G.S., M.R.I.A., *Assistant-Secretary in respect of Technical Instruction.*]

The problem involved in the position of small industries is one of vital interest in a country such as Ireland, yet it has altogether failed to receive the attention it demands. The rural exodus has continued for so long, that, though its effects are painfully apparent, it has come to be regarded almost as inevitable—as part of an established order of things. All kinds of explanations are offered to account for this desertion of the countryside, a favourite one being that the character of the rural labouring classes has seriously deteriorated, that the peasant is unable to resist the glamour and meretricious attractions of our cities, and that he prefers the ever-increasing competition, the discomforts and poverty of the city, to the comforts and healthy delights of country life. This explanation doubtless contains an element of truth, but is a very inadequate explanation, and it seems unlikely that any large number of rural dwellers would migrate to the towns if they could live with tolerable comfort in the country. The truth is that our rural population are the victims of untoward circumstances wholly beyond their control and the *fons et origo* of their discontent is to be found in the consequences of the industrial revolution—in the extensive replacement of handicraft by machinery and especially in the introduction of steam power. This involved the concentration of workers under one roof—the only practicable arrangement when the only known method of transmitting power was by means of shafting or belting. The hand worker then found himself face to face with a new order of things in which his skill and industry were of less account than formerly. In many cases he found his occupation gone. The spinning-wheel gave place to the “spinning jenny,” the handloom to the power loom, the knitting needles to the “Automatic,” and now the “tambour” is yielding to the Swiss Embroidery Machine. We may regret these changes; we may, and do, seek by all legitimate means to ameliorate the hardships entailed by them, but it is useless to ignore or oppose them. We must seek to use them and turn them to our advantage. The tendency in recent years has been towards huge and highly-organised industries, with resulting intense specialisation and division of labour under which the ordinary worker has, in many cases, become a mere appendage to the machine, with the

deplorable consequence that he loses that joy in his labour which has always been the solace and reward of the craftsman. There are signs of a reaction and these signs are full of hope. The condition of our cities urges decentralisation, and modern scientific discovery indicates its economic possibility.

A number of conditions, physical, geographical and social, point to the fact that the larger portion of Ireland is unsuited to the introduction of large, highly-organised industries such as characterise the north of England and the north-east of Ireland. I shall not elaborate this statement. I venture to express the opinion, however, that there is great promise of success in the development of small, well-organised industries suited to local conditions. Their establishment is as vital to the existence of agriculture as it is essential to the prosperity of the smaller towns of the country. Let us consider briefly the economics of such a class of industry as I refer to. We must at once dismiss as fallacious the notion that the availability of an old mill building or the neighbourhood of a waterfall are anything more than subordinate considerations. Much harm has been done by raising false hopes on the unsubstantial view that Ireland might build up industries on her water-power. There was never a greater fallacy. A comparison of the wages bill and the power bill of almost any Irish industry will dispose of the question.

The principal factors to consider are :—

- (1) The cost of labour.
- (2) The cost of raw material.
- (3) The neighbourhood of markets and cost of transport.
- (4) The cost of motive power.
- (5) Rents, etc.

The relative importance of these factors differs in different industries. The order in which they are set down here will represent their relative importance in many industries. They do not represent all the factors, and the incidence of those mentioned require careful study in the case of any industry. The cost of labour is in most industries a predominant factor and one that will determine—is indeed determining—the decentralisation of industries. The higher cost of living in cities necessitates higher wages. The workman in the smaller towns can with lower wages secure greater comfort. The difference between the rates of wages will in many cases be sufficient to turn the balance in favour of the small town. A further consideration of great importance to us arises here. The value of labour cannot be measured by the rate of wages alone. Low wages do not imply cheap labour. The technical training of the worker is a matter of paramount importance—a matter which, notwithstanding the rapid progress and spread of technical education in Ireland is still grievously neglected by us. Technical education is becoming

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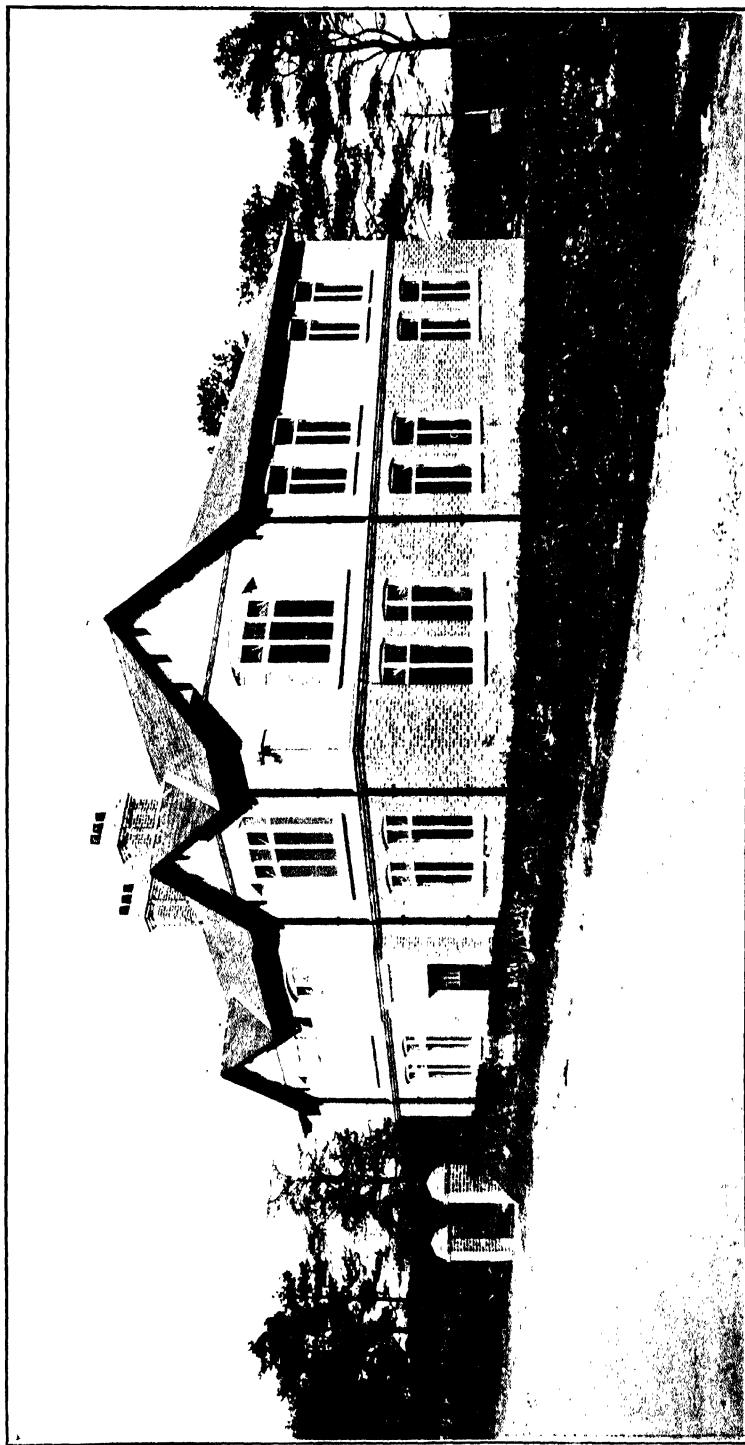


Fig. 1.—Ballydugan Embroidery School, Gilford, Co. Down.

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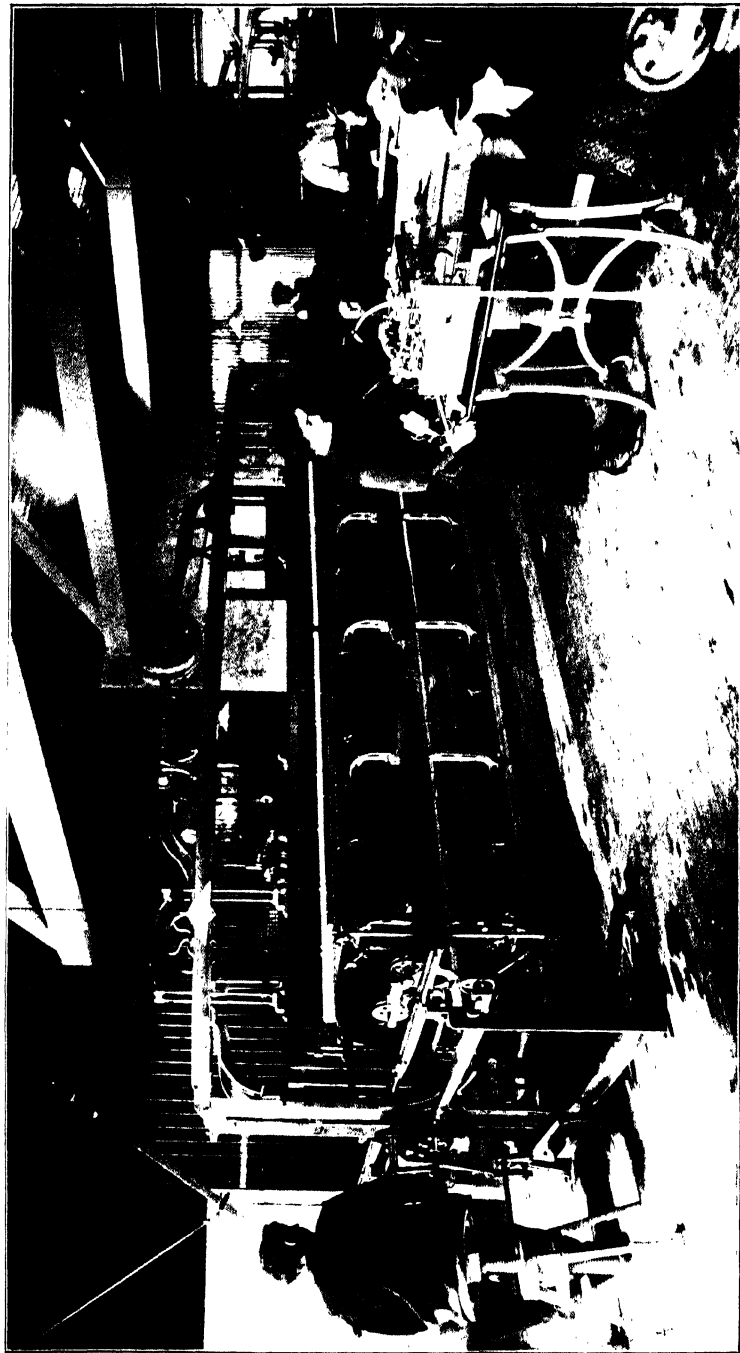


Fig. 2.---Ballydougan School—Interior---Needle-threading Machine on right.

compulsory in Germany. This is the last word in the highly-developed and highly-organised industrial system of Germany, where the union between industry and technical education is now complete. Unless employers of labour in Ireland realise more clearly the danger of the situation and take advantage of the available opportunities for the technical training of their apprentices and other workers they will fall out of the industrial race. The facilities now extended for technical training by the various schemes of the Department are exceptionally favourable. It has often been pointed out that one of the chief difficulties in starting an industry in a new centre is the lack of skilled workers. But the Department's schemes make ample provision for the technical training of such workers and have already carried it out in a number of cases, to one of which I shall shortly refer more particularly. The Department's scheme for the technical training of apprentices and other employés, and their Apprentice-Scholarship Scheme afford opportunities such as do not exist elsewhere, and which with hearty co-operation on the part of employers, will operate powerfully in building up the industries of the country. I here repeat what I have often before suggested, that employers would be making a good investment, and a patriotic investment, in making some slight concessions to technical education in the way of allowing their apprentices to attend technical schools in the day time for a limited number of hours each week. This would, no doubt, involve some inconvenience, but far less than that which will inevitably ensue from the neglect to secure this training. Bearing in mind the bold and confident policy of our continental rivals, which, let us remember, is only an extension of a policy which has been crowned by success, this concession is the smallest one that can be asked for. A few—very few—progressive firms are doing this. It should become general. Our system of technical education is, happily, still in a plastic condition, and there is the keenest desire to make it subserve our industrial needs. What an opportunity for a nation in the early stages of an industrial renaissance!

There is a further advantage favouring industrial enterprise in the smaller towns. Sites, and in many cases good buildings, are available at low rents. The movement towards decentralisation will tend to increase at a rapid rate. For reasons which will be apparent to the economist, and to which I need not do more than refer, industries tend to become gregarious. They are not inimical, but helpful to each other. Take only a single instance. The linen industry in Ulster has associated auxiliary industries of great importance. The hand embroidery of linen is carried on over the larger part of Ulster, and though carried on by women and girls, largely as supplying a supplementary income to the home, it yields something like a quarter of a million pounds per annum in wages.

The question of motive power demands a word. It is common

to overrate the significance of this factor as compared with the cost of labour. The question is, however, of great importance. It seems probable that scientific discovery which, through the invention of the steam engine, has led to the concentration of workers into huge factories in order to use power-driven machinery, will provide—has indeed provided—a means by which decentralisation can be economically secured. Some years ago I suggested that the most profitable method of utilising our huge stores of peat would be found in the producer plant by means of which the peat, partially dried, would be utilised *in situ* for the production of gas for use in gas engines and conversion into electric power, which would be transmitted at high pressure to the various industrial centres, where it would be transformed and employed for industrial purposes. I am deeply conscious of the difficulties in the way, principal among which is the lack of demand for the power. We may say that there is no demand because there is no supply, and there is no supply because there is no demand. This vicious circle must, of course, be broken. It may be claimed that Mr. Robb's experiment at Portadown has removed many doubts and difficulties, while the success that has attended the driving of looms for the weaving of textiles by means of individual motors has further helped forward the solution of this interesting industrial problem. We may yet live to see many a prosperous, smokeless industrial town in Ireland, with its group of small power factories under co-operative organisation, and supplied with electric power from the once useless peat bog. This question of driving woollen looms by means of individual motors will, I am glad to say, be dealt with this afternoon by Mr. Crowley who, besides being an expert in the woollen trade has had an almost unique experience in this latest mode of driving.

I have already referred to the hand embroidery of linen. This industry, still a very considerable one as I have indicated, was previously much larger. For the last twenty years it has declined in respect of the number of persons employed and the prices paid for work. This decline was due in large measure to the fact that linen manufacturers placed their orders abroad, where goods—handkerchiefs in particular—were embroidered by machine. The machine embroidery industry flourished exceedingly in Switzerland. The machines (introduced as far back as 1865) underwent great improvements. Schools of Machine Embroidery were established, and for the last twenty-five years some of our Irish manufacturers have had factories in St. Gall—a district having other interesting connections with Ireland. In view of these facts the Department sent their Inspector of Industries, Mr. Macartney-Filgate, to the Continent in 1909 to make a full inquiry into the conditions of the industry. His report to the Department was very full, and en-

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Fig. 3.—Maghera Embroidery School.

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Fig. 4.—Maghera School—The Hand Machine showing frames.

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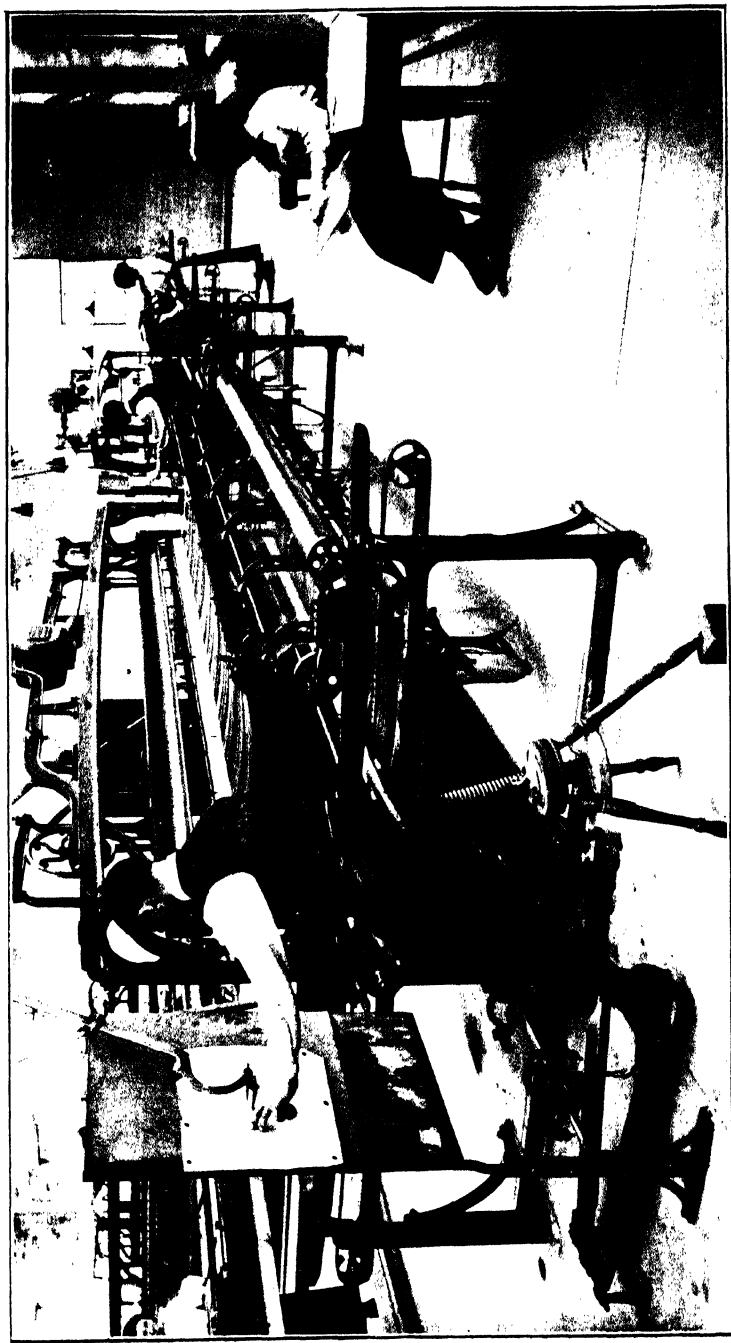


Fig. 5.—Maghera School—Showing how the Pantograph is operated.

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Fig. 6.—Maghera School—Hand Machines with Needle-threading Machines in foreground.

couraged the view that machine embroidery might be carried on in Ireland in association with the linen industry. A meeting of linen manufacturers was arranged in the Technical Institute of Belfast, and we discussed with them the possibility of introducing the industry into Ireland. The result was satisfactory, though an attempt to secure joint action failed. But the Department, working in conjunction with Mr. Blane of Ballydugan, near Gilford (Co. Down), succeeded in establishing the first machine embroidery school in Ireland three or four years ago, and it has proved a success. More recently a second one has been established at Maghera, in connection with Messrs. Glendinning, McLeish and Company, which promises a similar success.

These schools are well designed, light, and airy buildings offering pleasant conditions for work. The photographs which accompany this short statement bring out these facts, and also give some idea of the character of the machines. In the first place it should be remembered that no motive power is required other than that provided by the worker. The worker sits at one end of the machine which is operated by hand and foot. The enlarged design is mounted on a board and the operator follows it point by point with an indicator which operates a pantograph and moves the long frame holder containing the handkerchiefs which are held in position by metal frames. In the $6\frac{3}{4}$ yards machine as many as 234 handkerchiefs are embroidered simultaneously. The needles, pointed at either end, with an eye in the middle, are held by clips in a frame which moves to and fro on wheels. The 234 needles pass through the handkerchiefs at the precise points required and are seized by corresponding clips on the other side which slide back pulling taut the threads. The operator moves the pantograph indicator to the next point on the design and by the movement of a lever the frames containing the needle clips repeat the operation. The needles are threaded and the thread knotted and cut automatically by a beautiful and cunningly-devised machine shewn in the illustrations.

FRUIT CROP REPORT, MID-JULY, 1914.

The following summaries of reports obtained through the courtesy of a number of correspondents in the various counties show the prospects of the fruit crop at the middle of July. Much of the small fruit has been already marketed and the yields have been disappointing in the majority of cases. The prospects in the matter of tree fruits are not favourable for a large yield in most parts of the country. The rain that fell in February and March delayed work in the gardens to a great extent. April and May, however, were dry and the growth, though late in starting, came away rapidly, so that at mid-May the prospects were splendid, with a wealth of healthy blossom and foliage. Frosts, however, on the nights of the 23rd and 24th May (on the latter date 4 to 12 degrees of frost were registered according to locality and position) followed by a fortnight of very cold weather, destroyed the prospects of many an orchard. Gooseberries softened on the bushes and dropped off; strawberry and raspberry blossoms also suffered; black currants were singed and withered on the bushes; the late blossoming varieties of apples were injured, more especially in low lying districts, those in high grounds escaped the frost better than those in sheltered positions. The frost did little or no injury to plums and damsons as the fruit was already set in most districts. June was a dry warm month and the drought affected the small and bush fruits, to a great extent preventing a full swelling of the fruit. The apple crop, especially in grass orchards, is at present much affected by the want of rain.

Leinster.

Gooseberries are in general a good crop, but berries not large owing to dry weather. Strawberries are an average crop, best on heavy soils. In some districts the May frosts did harm. Raspberries are medium to average. Red and white currants are also above average. Black currants are also above average. Apples are fair to average, and in some parts are a good crop. Pears are above average. Plums are a very good crop. Damsons average. Cherries an abundant crop. The caterpillars of the gooseberry saw-fly, the winter and codlin moths did much damage and were favoured by the dry weather. Green fly is very prevalent and difficult to keep in check. Apple scab and American gooseberry mildew are still in evidence in some districts. Market prices are fair, gooseberries fetched 6d. to 8d. per gallon; strawberries 8d. to 6d. per lb.; raspberries 2d. to 4d. per lb.; black currants, 2d. to 4d. per lb. The demand is chiefly local.

Gooseberries are a very good crop ; the Strawberry crop was much injured by the frosts towards the end of

Co. Dublin. May. Raspberries promise a good yield. Red and White Currants are a very good crop. Black Currants are not so heavy a crop as last season. Apples show a light yield on all varieties. Pears and plums do not promise well. Damsons will not yield well. Caterpillars and green fly have been troublesome. Prices for gooseberries are good, being 2s. 6d. to 3s. 6d. per box (about 14 lbs.)

Gooseberries are a very good crop. Strawberries a failure in most districts. Raspberries are a bad crop.

Co. Kildare. Red and White currants are over average in most parts. Black currants are plentiful. Apples are an average crop. Pears very good. Plums on northern aspects promise well, but are a very poor crop on southern aspects. Damsons are abundant in some localities but under average in others. Early varieties of Cherries are bad, Morello's fair. Loganberries are a medium crop. Caterpillars and green fly have been busy during the dry weather. American gooseberry mildew is being gradually stamped out. Markets are good and prices advancing,

Gooseberries are yielding well this season. The Strawberry crop is not up to the average. Raspberries are also

Co. Kilkenny. below average. Red, white, and black currants are a good crop. Apples are a fair average crop ; Lane's Prince Albert and Worcester Pearmain have not fruited well. Pears and plums, both wall and standard, are good to over average. Codlin moth is prevalent this season, also American blight in old orchards. Marketing is done locally and prices are rather firmer than last year.

Gooseberries are an average to good crop. Strawberries are under average, but in some parts a fair crop was

King's Co. produced. Raspberries are fair to average but fruit is only medium in size. Red, white and black currants are cropping well. Apples promise a poor to average crop. Pears average. Plums and damsons are poor to medium. Cherries are average. Loganberries are yielding well. Aphis and red spider are prevalent this season. Fungoid diseases have not caused much trouble up to the present. Gooseberries are realising 8d. to 1s. per gallon ; strawberries 6d. to 10d. per lb.

Gooseberries are a fair crop of good sized fruit though somewhat damaged by frosts. Strawberries are a

Co. Longford. poor crop. Raspberries average. Red and white currants are a very good crop. Black currants fair. Apples : early varieties are best ; late varieties much

damaged by frost in the "setting" of fruit. Pears and plums show a very fair promise. Damsons have fruited well, as the frost did not seem to affect them to any extent. Caterpillars did much damage in some parts, otherwise not so much insect and fungoid attacks as in most years. Markets are in general poor.

Gooseberries are yielding well this season. Strawberries are only one-half an average crop. Raspberries promise

Co. Louth. a good yield. Red, white and black currants are a fair crop. Apples show a fair crop on the trees. Pears are about a half crop. Plums and damsons promise a good crop. Green fly did much damage this season. Prices : gooseberries 8s. per cwt., strawberries 4d. per lb., black currants 3d. per lb.

Gooseberries are yielding a heavy crop but the quality of the fruit is not good. Strawberries are above an

Co. Meath. average yield and of good quality. Raspberries are average. Red and white currants are a plentiful crop. Black currants average to very good. Apples and pears promise to be average, though in some parts there are reports of a failure. Plums are a fair to heavy crop. Damsons promise to be the heaviest crop for several years ; in some parts however the crop is reported as light. Loganberries are over average. American woolly aphid has done much injury to apple trees, and caterpillars have injured gooseberry and currant bushes. Canker is bad on apple trees. The principal markets are Dublin and Belfast and the prices obtained are average.

Gooseberries are a good crop but contain a large proportion of small fruit. Strawberries are a medium crop ;

Queen's Co. early varieties suffered most from the frost.

Raspberries are generally a poor crop of badly set fruit. Red and white currants are a good crop in most districts. Black currants are showing a medium yield of small fruit. The apple crop is very variable ; in some districts it may be described as full, in others the fruit is a failure. Some old trees bear a heavy crop. In new plantations the early and very late varieties promise best. Pears promise a very small crop. Plums show a medium crop, and damsons a full crop. Attacks of aphid and the caterpillars of the gooseberry saw-fly have been much in evidence of late. Gooseberries, strawberries, and currants are the only fruits yet marketed, and have found a good local demand at fair prices.

Gooseberries cropped exceedingly heavy this season but many of the berries were ruined by the frost. Straw-

Co. Westmeath. berries are under average, fruit did not swell well owing to the drought. Raspberries are an

average crop, except in low-lying districts, where frosts did harm. Red and white currants are an average crop. Black currants carry a heavy crop in general. Apples will be under average. The late-blossoming varieties suffered from the frost. The earlier varieties set a heavy crop but many have since fallen off. Pears are below medium in open situations but in favourable districts are over average. Plums are a heavy crop, but whilst standards are well laden, wall trees are only carrying a fair crop. Damsons are an excellent crop on established trees, but poor on young trees. Cherries are carrying an average crop. Insect attacks not prevalent with the exception of aphides and red spider.

Gooseberries cropped average. On light soils the fruit is small.

Strawberries are fair to average, very poor on

Co. Wexford. light and sandy soils. Raspberries are below average. Red and white currants are fair to good.

Black currants are generally below average. Apples are an average crop, young trees are carrying a heavy crop. Pears, a few varieties are bearing a heavy crop. Plums are medium. Damsons, though not much grown, promise fairly well. Caterpillars of the winter moth and gooseberry saw-fly were troublesome; attacks from aphides were numerous. Black spot and canker on apple trees and pear scab were prevalent. The markets are chiefly local; gooseberries fetched 9d. to 1s. per gallon, and 9s. per cwt. when sold in bulk. Strawberries commenced at 1s. 6d. per lb., but dropped to 1s., 9d., 8d., and 6d. per lb., as the season advanced. Black currants sold at 28s. per cwt. in bulk.

Gooseberries were a very good crop. Strawberries and raspberries have yielded well. Red, white, and black

Co. Wicklow. currants are a very good crop. Apples and pears promise a heavy yield. Plums and damsons are carrying an average crop. Morello cherries are a good crop and sweet cherries fair. Loganberries are an excellent crop. All fruits in general are very good throughout the county. Insect pests were very troublesome, especially the green fly and the caterpillars of the gooseberry saw-fly. The fungoid pests most prevalent are American gooseberry mildew in some districts, canker in apple and pear trees, and brown spot in apples and pears. There is a good demand locally for all fruit, and prices are average.

Munster.

Gooseberries are a very good crop in all districts. Strawberries gave a fair yield but fruit is only of medium size.

Co. Clare. Raspberries give promise of a large crop. Red, white and black currants are carrying a heavy crop. Apples are a good average crop on both young and old trees.

Pears are carrying a good crop in the open and also against walls. Plums are a fair to average crop. Damsons are not much grown and the crop is only poor to fair. Cherries are a good crop in orchards; where grown against walls the yield is very heavy. Apple sucker and the caterpillars of the gooseberry saw-fly have done damage in some districts, mealy aphid on plums and black fly on cherries have been troublesome. Apple and pear scab, also canker, are the chief fungoid pests. The demand for fruit is chiefly local. Prices : gooseberries fetched 1s. 4d. per gallon ; strawberries, 1s. to 6d. per lb. ; black currants, 3d. per lb.

Gooseberries were a heavy crop. The strawberry crop was variable, the earliest sorts gave a good crop of

Co. Cork. large sized fruit but the later varieties produced a small crop of hard fruit, chiefly caused by drought. Raspberries promise a fair to average crop. Red, white, and black currants are yielding well. Apples gave a great promise at the commencement of the season, but the subsequent heat caused many of the smaller fruit to fall off. There is still, however, promise of a full crop. Pears are moderate to good. Plums and damsons are medium. With the exception of attacks of the caterpillar of the codlin moth and a little American blight the apple trees are quite healthy. Canker is the chief fungoid pest. Brown rot has been fairly prevalent.

Gooseberries have been a very good crop in all districts. Strawberries a poor crop in some localities, good to

Co. Kerry. average in others. Fruit was much affected by the drought. Raspberries are a very good crop. Red and white currants are a medium to good crop. Black currants are carrying a heavy crop of large fruit. Apples are variable, better in some districts than others. Bramley Seedlings escaped the effects of frost and hail at the fruit-setting period. The crop will be a good average one. Pears promise a full crop. Plums and damsons not much grown, are an average crop. Cherries are a good crop. Loganberries are bearing well. The caterpillars of the gooseberry saw-fly were troublesome and the apple sucker is also prevalent. Canker and apple scab are the worst fungoid pests this season. Demand for fruit is local, gooseberries fetched 1d. to 3d. per quart ; strawberries 8d., 10d., and 1s. per lb.

Gooseberries yielded a good crop. Strawberries were only medium this season. Raspberries promise well. Red,

Co. Limerick. white, and black currants are carrying an average crop of fruit. Apples and pears promise a fair to good yield. Plums are a poor crop. The caterpillars of the winter

moth and gooseberry saw-fly were the worst insect pests, American blight is prevalent in some old orchards. There is a good demand locally for all small fruits. Gooseberries are selling at 9s. per cwt. ; strawberries fetched an average of 7d. per lb. ; black currants 3½d. per lb.

Gooseberries are an average to good crop. Strawberries are below average. Raspberries are a good crop
Co. Tipperary. where not injured by frost. Red and white currants are good to average. Black currants are cropping well. Apples are variable, good in some districts especially in sheltered sites on warm soils but under average in others. Pears promise a fair crop, best on walls. Plums medium, very good on walls. Damsons not much grown, the crop is good. Of the apple varieties, Bramley Seedling withstood the frost best, Bismarck, Lord Grosvenor and Lord Derby set the fruit better than others, whilst Lane's Prince Albert dropped the fruit badly. The caterpillars of the gooseberry saw-fly did much damage. Canker and mildew on apple trees and American gooseberry mildew were the worst fungoid pests. Fruit sells well in local towns, especially strawberries which fetched 8d. per lb. for the earlier supplies.

Gooseberries are a plentiful crop. Strawberries, not much grown, are a poor crop owing to very dry weather.
Co. Waterford. Raspberries are below average. Red and white currants are carrying a full crop. Black currants are a plentiful crop in most districts. The apple crop in general is good, the early blossoming varieties are promising best, but fruit is small. The fruit on pear trees grown against walls is abundant, but few and poor on standard trees. The variety William's Bon Chretien has borne freely. Plums are a light to average crop according to locality. Damsons are an abundant crop in some districts and poor in others. Cherries are a good crop. The caterpillars of the gooseberry saw-fly and winter moth did some damage ; green fly also was much in evidence. American gooseberry mildew and apple canker were the chief fungoid pests.

Ulster.

Gooseberries are a plentiful crop of good berries. Strawberries are a fair crop in some districts and very light
Co. Antrim. in others. The raspberry crop promises to be light owing to dry weather. Red and white currants not much grown, a fair crop. Black currants are a very good crop on heavy soils but poor on light soils. After an excellent prospect in spring the apple crop is now on the whole under average as the frosts towards the end of May did much injury, the fruit made slow

growth until lately. Pears are an average crop on wall trees but poor in the open. Plums and damsons are variable, in some districts there is a good promise whilst in others the crop is much below average. Insect and fungoid attacks were not quite so severe as in other years. American gooseberry mildew and the caterpillars of the gooseberry saw-fly did some damage. Apple sucker and caterpillars of the winter moth are prevalent in many gardens. The fruits marketed so far are fetching fair prices.

Gooseberries are a fair to good crop, the berries are rather smaller than usual. Strawberries are a small crop, and **Co. Armagh.** berries undersized. Early sorts suffered heavily from frost. The continued dry weather is shortening the marketing season. Raspberries are less than half a crop. Red and white currants are an average crop, not much grown. Black currants promised well in the early season but have dropped off badly and are now a small crop. Apples about two-thirds of a crop. Frost on the night of 24th May did great damage in low-lying districts; on high situations there will be a fair crop and the fruit promises to be large and clean. Pears are a fair crop in some districts but a failure in others. Plums are a good crop; Victorias have yielded well everywhere. Damsons promise a good yield all round. The most troublesome insect pests are the caterpillars of the winter, ermine, and tortrix moths. The apple sucker and green fly did much damage. Apple scab, canker, and brown rot are not so prevalent as last year. Gooseberries have been selling at 7s. to 9s. per cwt., black currants 28s. per cwt.

Gooseberries are yielding fairly well but the fruit are small in size. Strawberries are not up to the average of previous **Co. Cavan.** years. Raspberries are a medium crop. Red, white, and black currants are yielding well in some districts, on the whole the crop will scarcely be average. The apple crop is a failure, though in many parts a few varieties are cropping fair. Pears not much grown, the crop is under average. Plums and damsons are on the whole only medium. The caterpillars of the gooseberry saw-fly have done some damage to that crop. Markets are chiefly local.

Gooseberries are a good crop. Strawberries fair to good. Raspberries are a medium crop. Red, white, and **Co. Donegal.** black currants are not an average crop; in some parts the black currants are a failure. Apples are a very poor crop unless where well sheltered. Pears and plums give a very poor promise. Attacks of green fly were very prevalent this season. There is a good deal of mildew on all fruit trees. The

markets are chiefly local. Gooseberries realised 8*d.* per quart, and strawberries 8*d.* per lb.

Gooseberries are a heavy crop but in many gardens more than one-half of the fruit fell off after the frost of the

Co. Down. 24th May. Strawberries are a very light crop.

Raspberries a poor crop. Red and white currants are a heavy crop. Black currants are variable; in some districts the crop is heavy, in others much of the fruit dropped from the bushes before maturing. On the whole the crop is an average one. Apples promise to be a light crop especially on low-lying grounds, on high grounds there are some fair crops. Pears are a good crop. Plum trees on walls promise well, but in the open the crop is a failure. Damsons are a fair crop on high ground. Loganberries are yielding well. Cherries on high ground and on walls are very good. Attacks of green and black fly were severe in some orchards. The apple sucker also did much damage. The most troublesome fungoid diseases were canker and scab. Mildew attacked many fruit trees and gooseberry bushes. For average fruit of all kinds put on the market in nice condition the demand far exceeds the supply. Gooseberries realised 16*s.* per cwt.; strawberries 32*s.* to 36*s.* per cwt.; black currants, 30*s.* to 38*s.* per cwt.

The gooseberry crop is about one-third under average. Strawberries and raspberries one-half under average.

Co. Fermanagh. Red and white currants are a good crop. The black currants suffered badly from frosts and will yield only about one-half an average crop. Bramley Seedling variety of apple is a very good crop in a few places, in others almost a failure. The total crop of this variety will be about one-half of an average crop. Local sorts ("boilers") will yield one-third of the average crop. Pears are a good crop on walls but poor in the open. Plums promise about a two-thirds crop. Damsons though fair in some places will yield on the whole only a half crop. Aphides are not so plentiful as usual on apple and plum trees but are rather bad on the gooseberry bushes of late. Apple scab not so prevalent as during other years. No small fruit marketed except gooseberries, which are sold locally in small quantities.

Gooseberries are a very heavy crop in most districts. Strawberries good in some localities, and inferior in

Co. Londonderry. others. Raspberries bear an average crop. Red and white currants are yielding well. Black currants a good crop in many orchards, in others medium to bad. Apples are a good crop in sheltered orchards, in exposed situations the trees carry a very small quantity of fruit. Pears promise well

on walls but poor in the open. Damsons and plums are an average crop. Cherries are a poor crop except Morellos. The apple sucker and caterpillars of the winter and codlin moths were the most troublesome insect pests. Apple scab is fairly prevalent. Gooseberries are cheap this season realising only 7s. per cwt. ; raspberries were sold at 35s. per cwt., consigned to Richhill, Co. Armagh ; blackcurrants fetched 46s. 8d. per cwt., and were chiefly consigned to Glasgow.

Gooseberries are yielding a fair to very good crop. Strawberries are below average. Raspberries are also below average. **Co. Monaghan.** Red, white, and black currants are a fair to good crop. The apple crop is a failure in most districts. Pears not much grown, the crop is under average. Plums are a poor crop. Damsons in some districts are a failure. The crop is generally under average. The caterpillars of the winter moth and gooseberry saw-fly were much in evidence ; apple sucker not so prevalent as in preceding seasons ; gooseberry mildew and canker caused some damage. Black currants are sent direct to Richhill Jam Factory, the price realised being 26s. per cwt. Gooseberries from the Carrickmacross district are marketed in Dublin.

Gooseberries are a good crop though severely thinned by the frost ; berries are smaller than usual. Strawberries are below an average crop, berries small and the marketing season will be of short duration ; the seconds will be hardly worth picking. Raspberries are variable ; in some localities the crop is a failure, in others an average crop is expected. Red and white currants are a light to good crop. Black currants are below average, the fruit is small except where grown in damp soils. Apples are a very thin crop on the trees. Pears not much grown, a fair crop in places. Plums and damsons a good crop in general although in some districts the yield will be light. The caterpillars of the gooseberry saw-fly did some damage. The dry weather favoured the spread of aphid on plum and cherry trees. American blight is still in evidence on the older apple-trees. In Strabane gooseberries fetched 10s. per cwt. at mid-June and 7s. per cwt. at the end of the month.

Connacht.

Gooseberries are an excellent crop, fruit large and clean. Strawberries are in general a poor crop, frost destroyed much of the blossom and the dry weather prevented the fruit developing fully especially on dry soils. In some districts the crop is reported to be good. Rasp-

berries are a good average crop. Red, white and black currants carry a full crop. Apples are an excellent crop in the west and mid-land districts of the county but in the low-lying parts of the east of the county the frost did much damage to the blossoms. Bramley Seedling is favourably reported on as a heavy cropper this year. Pears are carrying a full crop. Plums and damsons promise an average crop. Loganberries are a good crop. Aphis has been more plentiful than usual ; caterpillars have done much damage. Produce usually disposed of locally. Gooseberries fetched 2*d.* to 3*d.* per quart, and strawberries 6*d.* to 9*d.* per lb.

Gooseberries are a very heavy crop in most districts. Strawberries an average crop in many places but very poor
Co. Leitrim. in other parts of the county. Raspberries promise a good yield in general. There is a fair show of white currants, but the red currants are a poor crop. In some districts both varieties are reported as up to average. Black currants are a poor to average crop. The south sides of the bushes are stated to have yielded best. Apples promise well in some districts but in other parts the crop is light. Pears are a very light crop. Plums poor to fair. Damsons have not borne well. The caterpillars of the gooseberry saw-fly have been active this season. Black currant mite and American blight have done damage to currants and apples respectively. Canker continues a source of trouble to apple growers. All fruit is generally consumed at home.

Gooseberries are a heavy crop and are better than for a number of years. The fruit however is small in size.
Co. Mayo. Strawberries are a good crop but later than usual. Raspberries are hardly up to an average crop. Red and white currants are a very good to average crop. Black currants are a very heavy crop. All varieties of apples promise a good crop. Pears in some districts have borne well whilst in others the crop is reported as bad. Plum trees in general are carrying an average crop. Damsons are a failure this season. Cherries are a good crop. Loganberries are reported as the best crop for many years. The caterpillars of the gooseberry saw-fly have done much damage. Small fruit are generally sold locally. Gooseberries in the Westport district fetched 1*d.* per pint, strawberries and raspberries 6*d.* per lb., black and red currants 6*d.* per lb.

Gooseberries are a very good crop, berries large ; old amber varieties have done well this season. The straw-
Co. Roscommon. berry crop promised well but late frosts and dry weather caused an almost complete failure. Raspberries are a good crop in some parts and a failure in others.

Red and white currants are a good crop and are ripening early ; berries are of a good size. Black currants are above average. Apples promised well and, though the dry weather has caused at least one-third of the fruit to fall, there still remains a fair crop all round. Pears are a good crop and promise to finish well. The plum crop promises to be the best for many years. Loganberries are a heavy crop of large fruit. Insect and fungoid pests have not given much trouble with the exception of aphid on plums and canker on apples.

Gooseberries are a heavy crop throughout the county. Strawberries have cropped well in some districts but—
Co. Sligo. badly in others. Raspberries give a fair promise but are ripening unevenly. Red and white currants are a fair to good crop. Black currants are a good crop and ripening well. Apples are a good average crop, particularly along the coast. The variety Charles Ross is reported to have withstood the drought well. Pears are a fair to good crop. Plums promise a medium yield. Loganberries are a heavy crop. Cherries fair. The caterpillars of the gooseberry saw-fly and magpie moth, also the apple sucker, were the worst insect pests ; apple scab and canker have done some harm. The market for fruit is chiefly local, with the exception of what is bought by the Portadown Jam factories. Gooseberries fetch 2*d.* to 4*d.* per quart locally ; strawberries 7*d.* per lb. ; red and white currants 2*d.* per lb. ; black currants 3*d.* per lb. ; Jam Factory prices, 9*s.* per cwt. for gooseberries ; 41*s.* to 45*s.* per cwt. for raspberries ; black currants, 28*s.* to 34*s.* per cwt.

CROP REPORT, MID-JULY, 1914.

As was pointed out in Crop Report No. 2 of the 8th July the weather during June was almost continuously warm and dry, and at the end of the month the effect of the long drought was apparent on all kinds of crops. In some districts little or no rain fell since early in May and much inconvenience was caused through shortage of water. Local rains fell in the northern area about 20th June and rain became general over the country on the 1st and 4th July. The rain brought much needed relief and it is anticipated that the effects of the present moist conditions will improve the agricultural prospect considerably. The rains which have fallen since the 8th inst. have benefited most of the crops to a great extent, and although only slight improvement can be hoped for in regard to the straw of the cereal crops, yet an increase in the yield and quality of the grain is anticipated. The potato crop, which is promising well, will be further improved, especially on light soils, where the foliage is deficient, unless blight attacks are favoured by the moist conditions; the other root crops, especially turnips which braided badly, will be also benefited. The late-sown flax crop will be lengthened in straw; and the pastures though bare should now soon show signs of improvement, with the results that cattle will thrive better and the milk yields become increased. Since the 8th inst. many reports have been received of the damages done to the turnip crop by the caterpillars of the Diamond-back moth.

The following paragraphs embody the information conveyed in a series of crop reports, etc., received up to the 15th July.

Leinster.

Wheat has continued to grow satisfactorily and promises to yield well. Oats are short in straw. The occasional rains which fell since the 4th inst. are improving the crop. The ears look promising and an average yield of grain may be expected. Barley is looking well and the yield of grain should be average. The Potato crop is growing well and there is a prospect of good yields. In a few districts the crop is backward. The early-sown fields of turnips are healthy. The late-sown crop did not come on well and had to be re-sown in many cases. Mangels are growing well and the dry weather does not appear to have affected them adversely. Cabbages did badly during the dry weather but have improved lately. First year's hay is saved in fine condition but the yield is considerably below average. Second and third year's hay is a very poor crop. Old meadows are very light. Pastures were very bare up to the

4th inst., but have slightly improved since. Live stock generally have not thriven well, and milch cows went back considerably in milk yield. Stores have dropped in price £1 per head during June.

Wheat is now fully in ear and promises well though the straw is short. Oats are looking well, except late sowings which are stunted in appearance. Barley is a fair to good crop. Rye is very little grown, and then chiefly on "bottom" lands which do not suffer much from drought and consequently the crop is good. Potatoes look well. The early crop, however, did not yield so well as last season. The maincrop varieties promise a good yield of tubers. The early-sown turnips are in many places a failure. The later sowings did better and are much improved by the recent rains. Mangels were not so much affected by drought as the turnips and promise an average crop. The first crop hay is saved in fine condition but the yield is under average. Old meadows, especially on light land, are not bulking well. Pastures are bare but the rains will improve them. Fat cattle are cheaper than last season but fat sheep and lambs have sold fairly well so far.

The wheat crop on the whole looks promising. Rust is noticeable in some districts. Oats have kept a splendid colour and in most places are thick on the ground but the straw will be short. The recent rains may produce a good yield of grain. Barley is looking very well in most districts and promises to be an average crop. The rye crop is very good. Potatoes affected by the frost during May have not in most cases fully recovered yet. The late-planted crop and those grown in boglands have done well, and on the whole the crop will be good. Turnips are poor but beginning to improve. The greater part of the crop had to be re-sown. Mangels are doing very well lately and promise a good crop. The hay crop is light but saved in prime condition. Pastures are very bare, especially on light land, but are now recovering. Cattle are fairly healthy but lack condition.

Wheat is looking well and is the best cereal crop this season. Oats are good in some districts, in others, especially where the soil is sandy, the straw is very short. Barley is a good average crop but the straw will be short. Potatoes are very promising in most districts, though in some fields the crop is uneven in foliage and the plants are thin on the ground. There has been no appearance of potato blight so far. Turnips are very poor and had to be re-sown in many districts owing to dry weather and fly attacks. Mangels are a fair crop. Cabbages have not done well this season. Hay is very

light, especially the first crop, but has been well saved. Pastures very bare but are showing signs of improvement. Dairy cows yielded a small supply of milk during the dry weather, and the store cattle trade is dull. Fat bullocks, sheep, and lambs have sold well but pigs have dropped in price.

Wheat is a good crop in most districts and promises well but in other parts the crop is light. Oats are very good

King's Co. on deep loams, but the straw is short on light soils. The recent rains will probably encourage a good yield of grain. Barley suffered much from want of rain and the straw will be short. The grain yield will be about average. Rye looks well. Potatoes look healthy in general and promise fairly well; there has not been so much spraying so far as in other years. Although there are some good fields of turnips the crop in general is a failure. Mangels are doing well. Cabbage looks fairly well. Hay is very light; first and second year's crops are well saved. Pastures are poor and cattle are not thriving well.

Wheat is very little grown; on good land the crop promises to be average but on light land the straw is short

Co. Longford. and the grain may not yield well. Oats are doing fairly well but the straw is short, the recent rains may assist in producing an average yield of grain. Potatoes look well and there are prospects of a good crop. Spraying has been thoroughly done in the county. Turnips have not done well as the dry weather was much against the crop; however they are now improving since the rain came. Mangels are only fair. The first and second crop hay has been made up in good condition but the yield is not one-half an average crop. Old meadows promise a small yield. Pastures are very bare. Fat cattle and sheep are fetching good prices. Fat pigs are down in price.

Wheat is looking promising. Oats are doing well and show a good ear but the straw will be short. Barley

Co. Louth. promises to be an average crop. Potatoes are growing well and the crop is healthy. Turnips are almost a failure except the very early sowings. Mangels are a good crop and now growing fast. The first year's hay crop has been light but well saved. Pastures dry and bare but recent rains will do much good. Cattle are not in good condition owing to the heat and flies.

Wheat is looking well and is expected to give an average yield of grain and straw; some varieties are showing

Co. Meath. signs of rust. Oats and barley are very short in straw but may fill out well in ear as the crop is healthy. Harvest promises to be early. Rye is a fairly good crop

but is not much grown. Potatoes look well and are forward though the haulms are not so large as usual. There are no signs of blight and most fields have been sprayed. Turnips are in a precarious condition owing to the effects of frost, dry weather and fly attacks, and re-sowing had to be done in some places as often as three times. The mangel crop is good in some fields but only middling in others. Cabbages all a poor crop and much stunted. First, second and third year's hay crop is light but made up in good condition. Old meadows will not yield well, especially where grazed late in the spring. Pastures are in general bare but stock of all classes are healthy though in thin condition. The rain which commenced to fall about the 4th inst. is improving all crops. Prices for lambs are good, but trade in ewes and wethers is only middling. Beef prices are rather disappointing.

Wheat is only fair and is thin in many places. The crop is now in full ear. Oats are under average and straw is

Queen's Co. short. On well-manured land the crop is average.

Barley is a good crop in most districts but the straw is short. Potatoes are fair but backward, especially on light land. Spraying is being carried out to a fair extent. Turnips are almost a failure but will now improve. Mangels are good where they brairded properly but in many instances the crop is patchy. Cabbages are bad in general. Hay is much below average but saved in good condition. Pastures are bare but will improve with the last rains. Although the grass has been much over-stocked cattle have done fairly well.

Wheat is well in ear but the straw is short ; the yield of grain promises to be average. The oat crop is in general

Co. Westmeath. very light in straw and it is not expected that the yield of grain will be up to average. Oats did best where grown after a manured crop. Barley is not promising well. Beans are doing well. Potatoes are a very healthy crop and promise a good average yield. Turnips suffered much from the frost, fly, and drought and it is feared that the produce will be light. Mangels are good. Cabbages are a poor crop. The yield of first year's hay is very light but well saved. Old meadows are not promising. Pastures are in general bare. Cattle and sheep have not thriven well except on the best lands. Prices of cattle and sheep are fairly satisfactory.

Wheat is a good crop generally but some fields are thin. Winter-sown oats are a good crop but spring-sown are

Co. Wexford. very short, especially on light land ; the crop promises well in regard to grain yield. The barley crop is average. The prospects of a good grain yield have been

helped materially by the late rains. Beans are short as regards straw, but well podded. The yield will scarcely be up to average. Potatoes are fair, in some places the crop is backward ; very little spraying is done so far. Turnips are almost a failure. The early sown crop grew well almost up to the singling stage, when they were attacked by the caterpillars of the Diamond-back moth. The late-sown crop was destroyed by the turnip fly and the above mentioned caterpillars. Mangels are a promising crop in most parts. Cabbages have not grown well this season. Hay is a very light crop but is saved in fine condition. Pastures are very bare and live stock, though healthy, are not thriving well.

Wheat looks promising but very little is grown. Oats are a good crop though the straw is short. The rain is helping the grain in the ear. Barley is a good crop but not much grown. The potato crop is now growing well and will be up to average. There is no appearance of blight ; very little spraying of the crop has been done so far. Turnips are almost a complete failure up to this date, but the rain is now doing much good. Mangels are a fair crop though patchy in many districts. Cabbages have done badly owing to the dry weather, which prevented many of the transplanted crop taking root in the soil. First-crop hay is good on rich damp soils but on other lands the crop is very light. Meadows do not promise well. Pastures are bare but live stock are healthy although not thriving well. Store cattle of 12 to 18 months old and fat lambs are selling well in local fairs.

Munster.

Wheat promises to be an average crop and there is not much appearance of rust. Oats are good on heavy damp lands, but the straw is short on dry light lands. With favourable weather the ear may fill well. Barley is a rather light crop, especially on dry soils. Rye on bogland promises very well. Potatoes are looking fairly well in most districts. Potato blight has not done much damage so far ; spraying is being carried out at present. Given a good season the crop is likely to prove an average one. Turnips on dry warm soils are almost a failure but on cool deep soils, particularly moory land, the crop is doing splendidly. Mangels are very patchy as much of the seed did not germinate. Cabbages are doing fairly well now. The first-crop hay is light to fair but old meadows promise a poor crop. Pastures are very bare except on rich damp lands, yet cattle are doing fairly well. Prices are good for cattle, horses and sheep though fluctuating much of late. Fat pigs are cheaper.

The wheat crop is promising well and looks healthy. Oats are short in straw as a rule, but in favoured situations and soil the crop is good. Barley promises well and judging from present appearances the yield should be good. Rye, chiefly sown for green feed, has given an average yield. The potato crop is in general healthy looking. In some parts the plants look stunted. Blight has not affected the crop to any extent as yet and spraying operations are general. Turnips are almost a complete failure, even where three or more sowings have been made. The re-sowing of swedes still continues and "fly" attacks are common. Mangels though growing slowly are an even crop, and under favourable weather should give a good yield. Cabbages where sown in drills during April are a failure. First-crop hay is well saved but the yield is below average. Meadows promise a light crop. The area under meadow will be reduced this year, as much of the land was grazed. Pastures are bare and overstocked. Live stock are in a comparatively low condition. The yield of milch cows is much below average for this season of the year.

Wheat, not much grown, looks fair. Oats on bare light land will give a poor yield of straw but on low-lying land the crop promises well. Barley is a good crop on strong deep land but inferior on light land. Rye is doing well, especially on peaty soils. The potato crop is very promising; spraying is being carried out at present. There is not much appearance of blight so far. Turnips in many cases had to be re-sown twice. The crop is much improved by the recent rains. Mangels on the whole are doing well. Cabbages are scarcely a medium crop this year. Upland hay is very light in yield. On low-lying moist meadows the crop will be good. Pastures are bare on light land but are doing well on damp soils. Live stock are healthy but not improving much owing to the scarcity of grass. Dairy cows are not milking well.

Wheat has suffered the least of the cereal crops from drought and is promising to be an average crop. Oats are, as a rule, a thin crop all round and the straw will be very short. Harvest will be early and the yield of grain will be under average. Barley is backward owing to late seed-time. The crop looks healthy but will probably be under average in yield of grain and straw. Rye is little grown but doing well. Potatoes are in general rather backward at present, except those which were sprouted. There are no appearances of potato blight so far. Spraying is being extensively carried out. Turnips, except in a few cases, are a poor crop and had to be re-sown two and often three times. The late rains will help the crop greatly. Mangels are an uneven crop, but have been doing well of late. Cabbages are very backward.

First-crop hay is light in yield but well saved. Old meadows promise a poor crop. Pastures are very bare but improving lately. The yield of milch cows has dropped considerably but may soon improve under favourable weather conditions. The price of fat pigs continues to fall.

The wheat crop is growing well and promises a good yield. Oats are a very short crop and have eared early. The

Co. Tipperary. crop may yet give a good yield of grain. Barley is doing well and the rains which fell, especially on the 4th inst., will improve the grain. Potatoes are satisfactory ; no appearance of blight so far. Turnips in general are a failure, owing to the dry weather and fly attacks. The early sown crop did best. Mangels are a poor crop in general. Where sown early the crop looks medium. Cabbages are poor. First- and second-crop hay cut out very light but is well saved. Meadow hay is also a light crop. Pastures are very bare and live stock did not thrive well. Prices of cattle and sheep are tending downwards.

Wheat good but not much grown. Oats are in ear in most districts and very short in straw. The crop looks healthy

Co. Waterford. in colour but it is anticipated that there will be a small yield of grain. It is expected that the barley crop will be one-fourth under average; the straw is short and the crop thin on the ground. Potatoes are mostly a good crop, the early varieties are of good quality. Not much spraying has been done yet. Turnips, which were a failure, have improved considerably since the rain came. Mangels where sown early are doing well, late sowings are uneven. Cabbages are poor and almost a failure where late sown. The first- and second-crop hay is well saved but the yield is below average. Meadow hay is short and light. Pasture is scarce and cattle are suffering in consequence. Cattle suitable for shipping are selling well. The supply of milk is at least one-tenth under the average for this season of the year. Store pigs are plentiful and prices are considerably less than at this time last year.

Ulster.

Wheat is doing well at present and will be an average crop. Oats are generally fair in appearance but on a considerable

Co. Antrim. area the straw will be short. Where grown on lea land the crop has improved much of late.

Beans are only medium. The early varieties of potatoes were a month later than usual. The maincrop varieties are growing well and give indications of a good crop. Blight has not yet made an appearance and spraying is being thoroughly carried out. Some fields of turnips are thinned and doing well, other fields are just

brairding. The mangel crop is variable in appearance ; in some districts the crop is good whilst in others it is reported as patchy. Cabbages are backward. The flax crop does not promise as well as last season. The rains which have fallen lately will materially help the late-sown crop. The first-crop hay is generally light but is being saved in good condition. Meadows in some districts are very short and the crop will be below average. Pastures are bare at present. Live stock are healthy and thriving fairly well ; the milk yield of cows is beginning to fail.

Wheat promises to be a fair crop. Oats on the whole will only be a medium crop in regard to straw but the
Co. Armagh. grain may yet bulk well. The early planted potato crop is very good ; in a few districts those planted late are patchy. On the whole the prospects are good. Spraying commences usually about the 10th of July and is general over the county. Turnips are backward and uneven. Flax in general will pull a short crop. First year's hay will be a very light crop. Where Italian rye grass is grown for seed the prospects are fairly good. Meadows are a short crop but may improve with the late rains. Grazing is bare and water scarce. Stock did not fatten on the grass so well as last year but are healthy.

Wheat is looking well but rather light in some districts. Oats are light in many districts but doing well lately.
Co. Cavan. On moory bottoms the crop is heavy. Rye is a rather light crop but on the whole is now growing well. Potatoes promise to be a good crop. The work of spraying is now being carried on. The turnip crop is uneven but the recent rains are doing much good. Mangels promise to be a good crop. Cabbages are good in most districts. Flax is a fairly promising crop generally. First- and second-crop hay and upland meadows are very light, low-lying meadows will yield well. Pastures are bare but cattle are in fair condition and healthy. All classes of cattle have dropped in price since mid-June. Young pigs are also down in price.

The yield of wheat will probably be under average. Oats in general will be short ; many fields are well in ear and not
Co. Donegal. over one foot in length. It is generally reported to be the worst crop for years back. Rye is a fair crop. Beans are a fair to light crop. The potato crop is doing well. Where the plants were damaged by frost the crop has made a good recovery ; very few attacks of blight reported as yet. Spraying is now being carried out in all districts. Turnips are variable ; some fields are singled and doing well, in others the plants are just

coming through. Mangels are doing well, especially near the sea-coasts. In a few districts the crop is stated to be backward. Cabbages are doing well. Flax is short in general though some fields are good. First-crop hay is light but being well saved. Meadow hay will give only a medium yield. Pastures have been dry and bare and water scarce. Cattle on the whole have not thriven well but are healthy. Good sized stores are selling well. Sheep still fetching high prices. Pork and bonhams have dropped in price lately.

Wheat looks well ; in some districts the crop was checked by the cold weather in May. The oat crop is in general
Co. Down. short, especially where grown after potatoes and turnips. The straw is longest on lea land. Barley promises to be a short crop of straw but the grain may yield well. Beans are short in straw and do not promise well. Potatoes that were early-planted or those boxed are looking well. The late-planted crop is not so good. Owing to the dry season spraying is being delayed. Some fields of turnips, especially where sown before the middle of May, look well, but late sowings were difficult to braird. Mangels are doing best on heavy soils ; the crop suffered much from drought. First crop hay has cut very light. The seed promises to be good though the yield will probably be small. Pastures are dry and bare ; cattle did well up to end of June but prices have fallen lately.

The small areas of wheat grown look well and promise a good yield, except on wet heavy land, where the crop
Co. Fermanagh. is patchy. Oats in general have done well, unless on very dry hilly land, where the crop is short. The rains at the beginning of the month have helped the crop. The rye crop has a good appearance and promises well. Potatoes look well, unless on very dry lea land where planted on ridges. Spraying is being carried out efficiently all over the country. Turnips are good where early sown ; but a large part of the crop had to be re-sown. Mangels are very variable ; in some places the crop is good but in others patchy. Cabbages are usually planted amongst potatoes ; the crop is doing fairly well. Flax will be rather short. The crop was too far advanced to be much improved by the rains which fell since the beginning of the month. The first year's hay crop is light in yield. Haymaking began early this season. Permanent meadows promise a small yield and quality will not be good. Pastures are very patched but have improved lately ; white clover is now showing well in the grazing. Prices of store cattle are good and beef is scarce and dear. Springers have dropped a little in price of late. Cows in milk are now giving a fair yield.

Wheat promises well. Oats on strong deep land are a good crop but on thin light land the straw will be short.
Co. Londonderry. The bean crop looks fair. Potatoes are doing well ; not much spraying done as yet. Turnips are variable—some fields doing well especially where thinned ; in other fields the crop is difficult to braird and these look stunted. Mangels are also variable owing to the dry weather. Flax on the whole is short but in some districts the crop is average and in others it is reported as better than last year. Hay is a light crop but the quality will be good. Pasture is bare in most districts but the rains which fell on the 4th inst. has made some improvement on the grazing. Live stock have been fairly healthy though backward in condition. Cattle of good quality are making fair prices and fat lambs command a ready sale.

Wheat, not much sown, is fair to medium in appearance. Oats are variable but on the whole do not promise well.
Co. Monaghan. Rye is good and has yielded well as green food. The potato crop is doing well ; not much appearance of blight so far. Turnips are inferior ; many fields had to be re-sown three times. Mangels have done best on moory ground. Flax will pull a short crop, especially in the Ballybay district. Hay is a very light crop, in some districts scarcely worth cutting. Meadow hay does not promise well unless on deep low-lying ground. Pastures very bare and water scarce. Cattle on the whole have not thriven well.

The wheat crop looks promising. Oats are generally short. The showers of rain which have fallen lately will lengthen the straw a little and improve the yield of grain.
Co. Tyrone. Rye promises to be a good crop but is not much grown. The potato crop looks well except on heavy soils and where the land was not well cultivated. There is no appearance of blight, and spraying is being carried out at present. Turnips are backward ; where the land was well cultivated or the seed sown early the crop is doing well ; a large area had to be re-sown. Mangels promise a fair crop. Cabbages are doing well in most places. Flax has made a great improvement but generally will pull a short crop. First-crop hay has cut out light ; where the land is dry meadows are poor but on damp soils in good condition the crop is growing well. Pastures are bare but improving. The scarcity of water had bad effects on stock, especially in regard to milk yield. Good strong stores are selling well, other grades are cheap. Springers and milch cows are fetching good prices.

Connacht.

Wheat is only a fair crop. The winter sown crop is best ; spring sown is rather poor and thin on the ground.

Co. Galway. Oats were considerably injured by the dry weather, and except on deep rich land the straw will be short. The barley crop is under average, the straw being very short. Rye chiefly sown on reclaimed moor-land has not suffered so much from the drought as the other grain crops, and gives a fair promise at present. The early sown varieties of potatoes were much affected by the frosts of the 24th May. Those not over ground at that date promise well though backward for this season of the year. Blight has appeared in a few places and most farmers have sprayed once. The turnip crop is very backward. In many parts it was a total failure and had to be re-sown three times. The recent rains will help the crop. Mangels are very patchy and backward. Where sown early the crop has come well through the drought. Cabbages are backward owing to the dry weather. First-crop hay is a light crop unless on good deep soil. Old meadows are light but much improved by the recent rain. Pastures are very bare and cattle not so forward at this period as in recent years. Fat stock are selling fairly well. Stores in thin condition are difficult to dispose of. Lambs are selling well. Wool is realising 1s. to 1s. 1d. per lb.

Wheat, little grown, looks healthy and is now well in ear. Oats are short in straw in most districts but on the

Co. Leitrim. whole the grain yield is good. Barley little grown, the crop is fair. Rye is a light to average crop. The early varieties of potatoes were much damaged by the frost on the 24th of May and in consequence were late in maturing. The main crop did not suffer so much as they were not so far forward at the time and now promise to be a good crop. Spraying is being carried out at present. In many cases the turnip crop had to be re-sown ; the crop, however, is now doing well. Mangels are generally an indifferent crop except where sown on moorland. Cabbages are a light crop. Hay is light but the quality is good. Pastures are bare owing to dry weather, but are now improved by the recent rains. Store stock are healthy and are making good prices.

The wheat crop is looking well, especially that sown in the autumn, The early-sown oat crop is doing well but the area

Co. Mayo. sown late is below average. In general the straw will be short. Barley is a fair crop and was much improved by the rains which fell at the beginning of the month. Rye, though late in being sown, promises a good crop. The potato crop though backward is healthy. Spraying is being carried out in all districts. Early sown fields of turnips are well forward but

those sown later are very uneven, often necessitating a second re-sowing. The mangel crop is patchy in many districts, in others it is coming on well. Cabbages are fair. The flax crop is uniform and kept its colour well through the dry weather; but even given the most favourable conditions from now onward the crop will pull short. The first-crop hay is very light but is being saved in good order; old meadows will give a poor yield. Pastures are very bare though slightly improved since the beginning of the month. Live stock have been very slow to put on flesh. Store heifers sold well this season.

Wheat is not much grown; looks good at present and is fairly well headed. The oat crop has improved much
Co. Roscommon. of late though a number of plots are patchy and uneven; the crop is now in full ear. Barley not much sown; plots on bog ground are doing well. The rye crop is looking fair. Potatoes have come on well lately; however the crop is backward for the season of the year. Not much appearance of blight so far and the spraying of the crop is being thoroughly carried out. The turnip crop is poor and had to be re-sown in many places three times. The frost, fly, and drought did much harm. Mangels are doing fairly well though backward. Cabbage plots were rather stunted in appearance but are improving. The first-crop hay is almost all cut and saved; the yield will be lighter than usual. Old meadows are also light. Up to recently the pastures were bare and patched but the rains at the beginning of the month have greatly improved them. Grazing stock have not put on much flesh so far. Milch cows are not giving the usual quantity of milk. All kinds of stock are healthy and, with the exception of fat pigs, are fetching good prices.

Oats are a short crop this season owing to the long spell of dry weather. Rye has done well and promises a good

Co. Sligo. yield of grain and straw. Potatoes got a severe check by the May frosts but the stalks are improving rapidly. Spraying is being carried out at present. Turnips and mangels have greatly improved of late. The cabbage crop is fair. The first-crop rye grass has cut a third short of average but is being saved in good condition. Old meadows are not nearly as good as last year and the return is estimated at a third less. Pastures are bare but made a slight improvement after the rains at the beginning of the month. Cattle are in general backward in condition, and the demand at local fairs, except for forward springing cows, is not now so good as in June.

REPORT ON THE PREVALENCE OF POTATO BLIGHT IN IRELAND UP TO THE 18th JULY, 1914.

The first appearance of Potato Blight this year was reported from Clifden, Co. Galway, on the 30th of June. Last year the first outbreak was noticed on the 20th of May. At Belmullet, Co. Mayo, blight appeared on the 1st of July, and on the 3rd of July at Gortnamonagh, Carrigart, Co. Donegal, and at Ballyglass near Killala, Co. Mayo.

For each of the weeks ended 4th July, 11th July, and 18th July respectively, weekly reports were received as in former years from approximately 1,300 rural Constabulary Sub-districts throughout the country. The following comparative table shows the total number of sub-districts from which blight outbreaks were reported in the corresponding three weeks of the seasons 1911, 1912, 1913, and 1914:—

1911.	1912.	1913.	1914.
28 up to 1st July 82 up to 8th July 129 up to 15th July	240 up to 29th June 572 up to 6th July 930 up to 13th July	43 up to 28th June 196 up to 5th July 283 up to 12th July	9 up to 4th July 31 up to 11th July 117 up to 18th July

Owing to the dry season and the backwardness of the crop very few reports of blight attack have been received up to mid-July. Such outbreaks as did occur were chiefly confined to early varieties, and in general the disease does not show any tendency to spread rapidly.

ACTION OF THE DEPARTMENT.

I.—*General.*

The action which has been taken by the Department this season to secure the more general practice of spraying may be stated briefly as follows:—

Over 200,000 copies of the Department's leaflet No. 14, dealing with the prevention of potato blight and giving full directions with regard to the spraying of potatoes, have been printed and distributed through the National Schools and numerous other sources to farmers in every district in Ireland.

Placards reminding farmers of the necessity for early spraying, and advising them to buy the raw material and prepare their own mixtures, have been displayed in every district in Ireland, and have also been sent to National Schools and to Creameries.

The County Instructors in Agriculture and Horticulture, of whom over 80 are now employed, have given special attention to the encouragement of spraying.

Loans are granted to farmers for the purchase of approved horse-spraying machines.

County Committees in a number of cases have hand-spraying machines available for hire at a small daily charge to farmers and others in the poorer districts.

II.—*Congested Districts.*

Fifty-six overseers and assistants, and twelve temporary demonstrators in spraying are employed by the Department in congested districts, and, as forming part of their duties, these officers are required :—

- (a) To repair spraying machines which are out of order.
- (b) To sell spraying machines where such cannot be obtained locally, to farmers within certain limits of valuation ; and,
- (c) Generally, to give demonstrations in spraying, as well as such instructions and advice as may be required by persons in their district.

The demand for spraying machines in congested areas has been great, and approximately 1,800 machines have been distributed this season.

III.—*Potato Diseases.*

The Department are continuing the investigations relating to potato diseases which have been in progress for several years at the temporary station at Clifden, Co. Galway.

A report on last year's investigations appeared in the issue of the Department's JOURNAL for April, 1914, Vol. XIV., No. 3. This report has been reprinted and a copy may be obtained free of charge on application.

Farmers are specially invited to co-operate by sending particulars of the occurrence of any of these diseases in their districts. Specimens of diseased plants for examination and report can be sent free by letter post when addressed to the Secretary, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion Street, Dublin. Such specimens should consist of the whole plant, including tubers, and should preferably be sent packed in a box.

THE MOST PROFITABLE CALVING TIME.

It is a well-known fact, that milch cattle receive a more uniformly nutritive daily feed during the winter months than during the summer months when the grass and green feeds occasionally vary in composition and consequently in nutritive value, and when unfavourable weather may diminish the milk yield.

The Danish Cow-testing Association has given special attention for many years to the best time for calving, and the statistics obtained show that the cows that calve in the winter half-year have a higher average milk yield than the cows that calve in the summer half-year.

In Danish cow-testing and competition work the fiscal year begins on the 1st of November and ends the following year on the 31st of October, and it is a general practice to divide the cows into two classes, viz., normal and abnormal cows.

When a cow gives birth to its third calf at any time during the first seven months of a fiscal year, it is classified as normal. Older cows that calve normally in the same period of a fiscal year are also classified as normal for that year.

Cows that abort one month or more before their normal calving time, farrow cows, and cows that do not give birth to their third calf during the first seven months of any fiscal year, are classified as abnormal. Other cows that calve during the remaining five months of a fiscal year are also classified as abnormal.

The following table is based upon the returns of four competitions between entire herds of red Danish dairy cows, each competition covering a period of two years, or eight years in all. The competitions included herds of cows of the same breed whose average milk yield was approximately equal and these facts add a greater importance to the tables.

Only normal cows are included in the following table.

[TABLE.]

CALVING TIME AND MILK YIELD FOR NORMAL COWS.

Calved in.	1894—1900				1903—1905			
	Monthly.		Quarterly.		Monthly.		Quarterly.	
	Number of Cows.	Average Milk Yield in Gallons per Cow.	Number of Cows.	Average Milk Yield in Gallons per Cow.	Number of Cows.	Average Milk Yield in Gallons per Cow.	Number of Cows.	Average Milk Yield in Gallons per Cow.
October	156	915	} 498	883	37	1,060	} 128	994
November	188	888			46	969		
December	154	843			45	966		
January	112	833	} 424	808	42	933	} 125	936
February	139	805			41	931		
March	173	794			42	946		
Average for winter half-year, 846 glns.								
April	142	738	} 329	723	39	858	} 76	843
May	104	709			21	842		
June	83	688			16	805		
July	43	621	} 221	786	18*	894	} 50	915
August	74	793			9	855		
September	104	850			23	955		
Average for summer half-year, 750 glns.								

* Amongst these cows there were several heavy milkers.

The tables show that the cows that calved during the October quarter gave an average of 160 gallons more milk during the period of lactation than did those that calved during the April quarter. Or, comparing the average of the winter half-year with that of the summer half year, 96 gallons more milk.

The conclusions drawn by Danish dairy experts with regard to the cause of the difference in the milk yield indicated in the foregoing table are :—

I. That the nutrient values of the daily feed during the summer are liable to fluctuate, partly owing to the varying nutrient value of the green feed (pasturage, etc.) and partly owing to unfavourable weather, and that this fluctuation diminishes the maximum milk yield.

II. That the nutrient values of the daily feed during the winter remains uniform regardless of the weather, and that this all round uniformity of the feed tends to keep the cows at their maximum milk yield.

The price of milk and butter during the winter season as compared with the summer season, constitutes another important economic advantage.

**When do
Danish Cows
Calve ?**

The following table shows when 34,217 cows calved, 1912-1913, and for the sake of comparison 98 cows are included from 1773, showing when cows calved in Denmark 140 years ago.

1912-13.		1773			
20th CENTURY MANAGEMENT.		18th CENTURY MANAGEMENT.			
October November December	} 11,378 Cows calved during this quarter	October 2 November 0 December 1	} 3 Cows calved during this quarter		
January February March		January 4 February 2 March 23			
April May June		April 29 May 14 June 8			
July August September	} 5,806 Cows calved during this quarter	July 5 August 4 September 2	} 11 Cows calved during this quarter		
Total, 34,217		Total, 94*			

* Four cows failed to become pregnant.

The 1912-13 table shows that two-thirds of the 34,217 cows belonging to cow-testing associations calved during the winter half of the year, while the 1773 table shows that two-thirds of the 94 cows calved during the summer half of the year.

Eighteenth-century and twentieth-century management are placed side by side in the foregoing table, so as to enable the dairyman to decide at a glance whether he is up-to-date or 140 years behind the times.

There can be no question whatever about the material benefit of the Danish calving arrangements; they constitute an enormous economic gain for Danish dairying. The constant uniformity of the feed nutrients during the winter season serves to keep the milk-yielding powers of the cows up to the maximum, and both milk and butter fetch higher prices in that season.

Sensible, up-to-date feeding, rearing, breeding, cow-testing, and calving arrangements have considerably diminished the cost of producing Danish milk and butter during the 140 years (or less) in question.

The chief economic factors that have enabled Danish dairymen to keep the cost of milk and butter production as close to the minimum as possible, are five in number, viz. :—

I. Breeding Societies, consisting largely of groups of small farmers, who co-operatively buy pedigree bulls (the progeny of cows

known to have given much milk containing a high fat percentage) for the purpose of improving their stock.

II. Cow-testing societies (consisting largely of members of the breeding societies referred to in paragraph I.) for the purpose of ascertaining on the one hand the cows that possess the hereditary trait of giving much milk containing a high percentage of butter fat in order to increase their number by breeding, and of eliminating on the other hand the poor milkers that do not pay for their feed and attendance.

III. Co-operative dairying and cheesemaking.

IV. Arranging the right calving time as indicated in the foregoing article.

V. Root feeding (chiefly yellow mangels and swede turnips).

Danish farmers usually sow a statute acre of roots for every three adult cows they keep.

Every Danish dairyman is convinced that roots form the basis of the economic feed. No roots involves actual loss. Shortage of roots involves curtailment of profits. Plenty of roots reduces the cost of the feed to a minimum.

Mr. L. Helweg, the Danish root specialist, who has been the leader of Danish experimental root culture for the last 25 years, and is now the highest Danish authority on the root question, says in his book, *The Culture of Root Seeds* :—

“The Danish root area in 1896 was 180,000 statute acres, in 1901 it was 250,000 statute acres, and in 1908 over 320,000 statute acres. . . . In the seventies (1870-80) the total weight of the root seeds annually sown in Denmark amounted to 183,800 lbs., while the weight of the seeds sown in 1908 was as follows :—

	English lbs.
Barre's Yellow Mangel . . .	1,658,500
Swede Turnips . . .	551,160
Aberdeen Turnips . . .	606,270
Carrots . . .	66,140
	<hr/>
	2,877,070 ”

The quantity of root seeds sown in 1908 is over twenty times greater than that sown in the seventies.

JOHN J. DUNNE.

Odense, Denmark.

TELEPHONES FOR FARMERS AND OTHER RESIDENTS IN RURAL DISTRICTS.

The Postmaster-General has issued a memorandum calling the attention of farmers and other residents in rural districts to additional facilities now offered for the co-operative use of a telephone service.

The Postmaster-General states that residents in rural districts are apt to think that a telephone is a luxury of town life which it is impossible to enjoy in the country except at a high cost. This is true if each person requires a separate exchange line, consisting of two wires over the whole distance between the exchange and his residence, to be provided for his exclusive use, but such a line is not necessary in order to enjoy most of the advantages of the telephone service. If a sufficient number of subscribers living on or near a country road leading to a town where there is a telephone exchange will agree to use one line, they can telephone as much as they please to people on that exchange for a moderate fixed charge of £3 or £3 10s. a year, according to the proportion between the number of subscribers and the length of the line.

In the United States there are to-day more telephones in use by farmers than the whole number in use by the commercial and all other classes in the United Kingdom, and these telephones are found to add to the profits and comfort of the farmers to an extent which makes the cost of the telephones seem negligible.

The Postmaster General is ready to provide lines of the same kind in the rural districts of the United Kingdom. By means of such a line a farmer can speak from his farm to all the people who are telephone subscribers with whom he does business, not only in the nearest town but also as a rule in all places within a distance of about 100 miles. He can also send messages and receive replies by telephone when his correspondents are not telephone subscribers, or he can get them to speak to him from a public call office. If a machine is broken he can order a new part without the trouble of a journey into the town or the delay of sending an order by post. He can get the latest information as to market prices, and arrange to the best advantage for the sale of his produce and stock, and he can get any weather reports and forecasts which he may want to guide him when crops have to be gathered. In the case of illness a doctor can be summoned or a veterinary surgeon for his horses and cattle. If a fire occurs assistance can be called. He can speak to any neighbouring railway station and arrange for the despatch or delivery of his goods and produce. He can despatch a telegram without the trouble of sending a messenger to the telegraph office, and he can

receive his telegrams by telephone without waiting for a messenger to bring them out, and he can also call a messenger to take an express letter. In a short time the telephone becomes the most valued implement of the farm.

Co-operative movements among farmers for the use of central dairies and creameries, or for the collection and distribution of produce, can only be worked to the best advantage if a telephone service is available to bring the farms of members into direct communication with the central establishments.

If a farmer has a telephone he can in a few minutes, when he is at home for breakfast, dinner, or supper, do business which otherwise would involve inconvenient and expensive journeys to neighbouring towns, or which he could not do at all owing to the delay involved in reaching the other parties concerned. When his work is over, he and his family can talk to their friends and neighbours, and can even arrange social meetings which would otherwise be impossible. In many other ways, too numerous to mention, the telephone helps him to overcome the chief drawbacks of country life and enables him to do business on as good a footing as if he lived in a town.

If a telephone service of this kind is required application should be made to the Secretary, General Post Office, London. Before applying try to interest your neighbours in the scheme, and find out how many are willing to join at the rate of £3 or £3 10s. per year for unlimited calls on their own exchange, and with the power of talking to other towns at the rate of 1d., 2d., 3d., per conversation, according to the distance for towns within 25 miles and at the rate of 6d. for towns within 50 miles.

To make the scheme practicable a minimum of three subscribers is required for each line. Their residences must lie on the same route from the exchange and there must be on an average at least two for each mile of route, exclusive of the first half mile from the telephone exchange. If there are on an average three subscribers or more to the mile of route, the rental for each subscriber will be £3, but if there are only two subscribers to the mile the rental for each will be £3 10s.

Full particulars will be sent by post by the Secretary, General Post Office, London, and, if there is any prospect of a successful scheme, a representative will come to discuss the matter with you personally.

THE CIVIC EXHIBITION, DUBLIN, 1914.

On July '15th there opened in the Linenhall Buildings, Dublin, an Exhibition of a character altogether novel in these countries. For some years past public interest in civic matters has been quickened by the work of a number of Societies, notably the Women's National Health Association, the Housing and Town Planning Association, and others, while in March of the present year the Civic Institute of Ireland, Limited, was formed for the purpose of the study and investigation of all questions and problems affecting the lives of the Irish people in their capacity as citizens or as inhabitants or any City or Urban or Rural area in Ireland. This, however, is only one of its objects, another being to establish and promote the Civic Exhibition which was opened by His Excellency the Lord Lieutenant on the 15th July.

The enterprise is a bold and comprehensive one. The difficulty of finding a suitable home for the Exhibition was very considerable, and ultimately it was decided to seek the approval of the Board of Works for the utilisation of the disused Linenhall Barracks. Neither the site nor the buildings appeared promising on first view. The buildings are situated in a thickly populated area, and it was clear that a considerable amount of work would have to be done to render them suitable for the purposes of an Exhibition. The position of the buildings, however, will, it is believed, turn out to be a happy one from the point of view of the objects of the Exhibition, and as regards the suitability of the buildings themselves a very remarkable change has taken place.

A large and influential executive Committee was formed under the Chairmanship of Her Excellency the Countess of Aberdeen, and very vigorous operations were begun on the buildings, which have been completely transformed. Large courts have been roofed, and the general interior of the buildings beautified.

THE OBJECTS OF THE EXHIBITION.

The objects of the Exhibition, put briefly, are to show Irish life clearly and vividly as it is, and to point out how some of our social problems may be solved. It therefore appealed strongly to a large number of organisations and associations, and almost every association whose objects are in agreement with those of the Exhibition elected representatives to serve on the Executive Committee, which thus became very representative.

The Committee were fortunate enough to secure as an expert adviser Mr. John Nolan, M.A., D.Sc., of Cambridge, Massachusetts, who has had very considerable experience in Town and City Planning,

and who came over to organise the Exhibition at the start of the movement. Mr. George L. O'Connor was appointed Director, and Mr. W. A. McConnell, Secretary.

In a very short space of time then an Exhibition of very considerable interest has been got together. Reference has already been made to the Housing and Town Planning Association, the exhibit of which, organised by Professor Geddes, is one of enormous educational value. Its value, however, will be very greatly enhanced by the organisation of a Summer School of Civics which is to be held in the Exhibition from the 27th July until the 15th August. Professor Geddes will be the Organiser of this School, and arrangements have been made for numerous lectures and discussions on Regional and Civic Surveys, on Geography and Nature Study, on Town Planning and Public Health, on Education, on Citizenship and on many other matters of vital importance to civic welfare. These lectures and conferences will be accompanied by demonstrations and excursions to places of interest, and promise to be largely attended. Teachers will come from all parts of Ireland.

A PRIZE FOR TOWN PLANNING.

In connection with the Town Planning section of the Exhibition considerable interest centres round the offer by the Lord Lieutenant of a Prize of £500 to be awarded to the author of the best design for the re-planning of Dublin.

The work of the Women's National Health Association is in evidence everywhere, and attention may be drawn to the very valuable and interesting Child Welfare Exhibit.

By permission of the Benchers of King's Inns the principal entrance to the Exhibition is through the King's Inns Gardens via Henrietta Street, and in these gardens special and very complete provision has been made for playgrounds for children.

Among the more important exhibits is the Public Health and Food Section in charge of Professor W. H. Thompson, and the Historical Art and Archæological Section. The Main Hall is mainly devoted to Industries and Commerce. In these exhibits typical Irish products and industries are exhibited in an attractive manner.

THE WORK OF THE DEPARTMENT.

In the earlier stages of the movement the Department was approached, and undertook to organise an exhibit. The Agricultural Branch and the Technical Instruction Branch of the Department have each organised exhibits illustrating the work of these respective Branches in the country. The pavilion of the Agricultural Branch has been erected on the old Parade ground, which has been artistic-

ally laid out, and has working exhibits, specimens and diagrams illustrating dairying, cheese-making, milk distribution, seed-testing, manurial experiments, tobacco growing, poultry keeping, and other matters of interest.

The exhibit of the Technical Instruction Branch of the Department will be found in the East Court and the rooms surrounding it. The East Court itself has been roofed and converted into a pavilion, which provides accommodation in which are given daily demonstrations in Manual Instruction (Woodwork), in Cookery, and in Rural Science and School Gardening. A most unpromising corner of the buildings has been converted into a beautiful School Garden, while exhibits of fruit, flowers, and other garden produce are sent up at frequent intervals from various selected School Gardens in connection with National Schools in various parts of the country. The rooms surrounding the East Court contain exhibits contributed by various Technical Schools and County Authorities in Ireland. Among the more interesting examples are those illustrating Engineering, Building Construction, Woodworking, Cabinet-making, and various forms of home industry. Art and Art Crafts are well represented, and Miss Gleeson of the Dun Emer Guild has organised a small working exhibit, illustrating the making of artistic hand-tufted carpets and rugs. There are among the Art Crafts examples of Mural decorations suitable for public buildings, Stained Glass and Enamels, while two small rooms are fitted up with examples of specially designed furniture suitable for workmen's dwellings.

In connection with the Technical Exhibit it is proposed to organise a Prize Competition for the best Family Budget.

Those mentioned are but a few of the exhibits which, until the end of August, will serve as a means of instruction and recreation to many thousands of people, not only from Ireland, but from various parts of Britain and the United States of America. It is not possible in a short account to indicate the many points of interest in this large and excellently organised Exhibition. It is hoped that it will contribute in no small degree to the development of the Civic spirit and to the solution of the many social problems which, for their treatment, require such knowledge and inspiration as the Civic Exhibition is endeavouring to provide.

G. F.

TECHNICAL INSTRUCTION FOR SMALL-HOLDERS.

** * A paper read before the Thirteenth Annual Congress of the Irish Technical Instruction Association by L. J. HUMPHREY, Department's Organiser in Rural Science (including School Gardening).*

In England there are many men who are making a comfortable living by the growing of fruit, of flowers, by seed growing, and by other methods, on from three to ten acres. In the district around Evesham, in Cambridgeshire, and in Essex, there is abundant evidence that the amount smallholdings produce is amply sufficient to keep a smallholder and his family in comfort, and to admit of his making some provision for the future.

From time to time reasons are given for the increase of smallholdings in each of these districts. Sometimes nearness to markets, sometimes the character of the soil, and at other times the thrifty habits of the people are given as the reasons for their success as cultivators of a few acres.

But none of these reasons are quite sufficient explanation for every case, and there is good reason for thinking that the force of a successful example has been a potent, if not actually the principal cause of the remarkable increase in smallholdings in certain districts.

Recognising this potent force, not only in connection with smallholdings, but also in connection with other industries, my

brother and I devised a scheme, just over three
A Successful years ago, to establish smallholdings in districts
Experiment. which had previously been given over entirely to large farms. The first farm selected was one of seventy acres in Essex. Those of you who are interested in English agricultural matters will know that Essex soil is not too highly thought of by farmers, and in fact, there is in many cases a distinct prejudice against the county. The farm was three and a-half miles from the station, and there were no special qualities possessed by the settlers who took up the holdings, except that they had the enterprise and courage to plant fruit trees, flowers and asparagus in a district where fruit trees were never planted, flowers never sold, and asparagus never seen. The project was successful to such an extent that we desired to work out a more complete scheme on a larger area, and with a larger number of holdings. This we were enabled to do by obtaining capital for the purchase of a farm of

815 acres in Kent. This farm is situated about 23 miles from London, and at the time we took it over it consisted of some 50 acres planted with fruit trees and bushes, about 60 acres of pasture, and 27 acres of woods, the remainder being arable land. The offer of the land in small areas attracted applicants of almost every class, some 40 of whom took up holdings of from 3 to 10 acres. All these holders agreed to purchase their holdings, to become small-owners, in fact, either by an immediate cash payment, or by means of deferred payments on the annuity system. Ownership is preferred for a number of reasons, but principally in the case of the smallholder because of the value which his own labour, and the natural growth of his fruit trees, adds to the property, a value which is with difficulty realised under a tenancy system.

Some of the holders proposed to obtain their livings entirely from the holdings, one or two were in receipt of pensions, while others were in commercial offices. These latter regard the holdings as a source of supplementary income, which in a few years will enable them to give up their office work and devote their energies entirely to the holdings. The prospect of a permanent source of income, freed from the risks attendant on the pursuit of a commercial career, made an appeal to business men which they found hard to resist. Several of the holders were practical gardeners, but almost without exception those who took up land on the farm would have been rejected by the Council Committees who have the selection of suitable applicants for smallholdings under the Smallholdings Act.

It will be obvious that to allow such people to take up smallholdings without some means of guiding and assisting them would be greatly to delay, if it did not actually prevent, success. But in devising a method of as far as possible ensuring success, several points had to be considered. In the first place, the smallholders were men approaching middle age, to whom any form of compulsion under any guise would be repugnant. No compulsory courses of lectures or preliminary weeks of training could therefore be insisted upon. Secondly, no system of spoon-feeding could be adopted, it being a cardinal principal that nothing must be done which could not be justified as being in agreement with commercial methods, as it was argued, that if smallholdings can only succeed by non-commercial aid, then there is something wrong with smallholdings, and business men should not be asked to finance such undertakings. The recognition of these conditions did not prevent us from realising that it was commercially possible to assist the smallholder by the use of capital and by means of advice and instruction. The opinion was held that the presence of successful smallholders in a community would benefit all members

of the community, including the organisation providing the capital. Any proposal which would enable the smallholders to become permanently successful was therefore permissible.

The first step taken, after the purchase of the farm, was the establishment of a central dépôt which might become the organisation centre of all the holdings. **The Central Dépôt.** For this purpose the existing farm buildings were utilised, and they now form what is generally and familiarly known as the Dépôt. This dépôt was equipped with farm implements of almost every useful kind, including ploughs, harrows, carts, wagons, sprayers for fruit trees, weighing machines and fruit baskets. An oil engine in one of the barns was employed for the grinding of corn, root cutting, oat crushing and chaff cutting. The dépôt was placed in charge of a farm manager, in whose office was installed the telephone. The manager was instructed to do all in his power to enable the holders to become successful. The farm staff, implements and horses under his control were to be hired out to the smallholders at fixed rates, and he was also to cultivate the land which was not then taken up by smallholders. Advice of all kinds was free, but assistance had to be paid for. The farm manager was also to undertake the disposal of all kinds of produce, and to advise on the best markets for the purpose.

All these facilities were immediately taken advantage of to an extraordinary extent, day after day the office was visited by smallholders who either wanted work done on their holdings or advice on some question of cultivation. A full staff is now continually employed. The dépôt frequently acts as a labour exchange, one smallholder being employed to work on his neighbour's holding whenever slackness of work or shortness of money makes such arrangements necessary or desirable. No smallholder has ever been unable to obtain work through this agency. The result of the establishment of this well-equipped dépôt is that no smallholder owns a farm horse, a plough, or any of the heavier or more expensive farm implements, and he has had no need to build a stable or implement shed. It is estimated that the total saving of capital to the smallowner is at least £50 per holding. There is no loss of cultivating power. There is even a gain, as the implements at the central dépôt are well maintained, frequently renewed, and consequently more efficient than those in the possession of a holder of a few acres could possibly be.

The smallholder who requires work carried out on his holding by the dépôt staff calls at the office at the farm, and discusses with the foreman or farm manager the work to be done. Between them they thrash out the matter very thoroughly, and all the pros and cons, including the cost of the work, are fully discussed before instructions

are given to proceed. The implements are being added to from time to time, and the equipment now includes a motor tractor, using paraffin, which one day ploughs a holding and the next is engaged bringing goods or manure from the station. At one period there was such a quantity of ploughing to be done with this tractor that an acetylene head light was fitted, and ploughing was continued each evening until long after darkness had set in.

It is too early to say whether machinery and such appliances will effect any revolution in our methods—we

Machinery. do not anticipate that they will, but we do regard enterprise of this character as being of great educational value, and at the moment land can be ploughed to a greater depth and at a lower cost with the tractor than by means of horses. We feel, too, that the organisation must be ready to make experiments with up-to-date implements in order that, should such appliances prove of advantage, the smallholders may be in a position to compete in every way with other users of modern appliances. For similar reasons, during last year a 200 ft. green-house and a mushroom house were erected, in which crops are being grown to test their profit-earning possibilities. If the results prove satisfactory, it is the intention to supply green-houses on easy terms to those of the smallholders who are ready to take advantage of the results of the experiment.

Sprayers are of course available for the prevention of injury by insect and fungoid attacks; and skilled workmen, including pruners, poultrymen, woodmen—who carry out the work of fencing with poles cut from the woods—can be hired for any length of time, the aim of the central dépôt being to anticipate and to meet every material need of the smallholder. There is a certain amount of specialisation among the workmen, and a smallholder can engage an expert pruner one day, and a man accustomed to poultry on another day. He is never at the mercy of the rural counterpart of that mishandler of tools known as the jobbing gardener. The time of the men employed on the dépôt staff is accurately checked. The responsible foreman must show that his men have been profitably employed each day, and that they have not been given jobs just to keep them occupied. Most of the employees are paid by the day, but work is often accepted at piece-work rates,—so much an acre for hoeing, so much an acre for ploughing, and so on. An unsatisfactory workman is soon discovered, but if there is any doubt the man is engaged at piece-work rates until his value is proved. By this system, the actual cost of the various operations is easily ascertainable, and there is an approach to the system of the workshop in which working costs are closely investigated.

By the provision of this central dépôt, equipped with a full set of modern farm implements, useful horses and a thoroughly competent

staff, the proper cultivation of the holdings can be practically ensured. There is no compulsion about any of the work. If a smallholder chooses, he can make all the old, and as many new mistakes as he likes, without interference from the *depôt*, but in practice it is found that advice and assistance are readily sought, and what is perhaps of greater importance, the advice is generally followed. The men of the farm staff who are engaged by smallholders to work on their holdings are not sent as teachers, but they are good workmen, and an intelligent smallholder working beside the experienced farm labourer can soon learn the best ways of carrying out the operations connected with the holding. But in addition, it is the foreman's duty to see that any of his men engaged by smallholders do an adequate amount of good work. He visits the holding as though it were a part of his workshop, and the work is usually well done, for on the one hand the smallholder takes care that the time he pays for is fully utilised, and on the other the foreman sees that no mistakes in cultivation are made.

In dealing with the question of marketing, the *depôt* acts as a bureau of information. Before the season

Marketing. commences selected salesmen are written to, their status investigated, and particulars of what they are able to dispose of are tabulated and recorded. During the season telegrams are frequently received, giving information regarding the character of the demand and the prices realised in the various markets. This information is passed on to the smallholders, and for example, when the green gooseberries, which form the first fruit crop, are ready, the smallholder will call at the office with a query as to the day's price on the market. Having obtained this information he can decide whether to pick that day for the next day's market, or to wait for a day or so. The *depôt* staff will, if necessary, undertake to harvest the crop, to grade and pack it and to send it for sale to a chosen salesman. If the smallholder prefers, he can sell the crop early in the season at a fixed price to the jam factory, when he is relieved of all trouble and anxiety as to gluts and market conditions. This jam factory has been fitted up in a portion of the farm buildings, and the oil engine which is used to drive the chaff cutter and other farm machinery also serves to drive the machinery in the jam factory. An experienced jam boiler from Evesham is in charge of the factory, which has already proved its usefulness.

Some curious facts have come to our knowledge regarding this question of marketing. Last year, for example, a Hampshire smallholder told us that he had found the best market for strawberries that year had been Dublin. In the previous year strawberries were sent from the Kent farm to Belfast, where they realised

2½d. more per lb. than similar strawberries realised on the same day in London. We had offers to purchase strawberries from a town in the south of Ireland at very satisfactory prices, the buyer paying carriage. The black currants all went to Wigan, a 14 hour journey ; cherries, although wanted at Cardiff, also went to Wigan. Just now, among flowers, marguerites are selling well in the North of England ; last year an experimental plot of these flowers produced £29, whilst one of the Essex smallholders made £80 from one acre under this crop. The flowers are packed in boxes, travel 3½ miles by road, and then another 200 or 300 miles by train from Essex to Newcastle, Nottingham, Manchester, and other North of England towns. A little earlier double arabis was saleable, and later in the season, pyrethrum, statice and asters follow.

This flower growing is highly profitable ; as a smallholder puts it, the carriage on a box of flowers is a good deal less than on a sack of potatoes, and it is seldom the potatoes fetch more than the flowers. To put it in another way, a horse can take to the station £9 or £10 worth of flowers, when it could only convey £3 or £4 worth of potatoes, and it will have taken about an equal area to grow them. The marketing problem is to some extent solving itself, several of the smallholders now having private connections, but the jam factory established last year has been of very great assistance in dealing with perishable and surplus fruit. The districts around Tiptree in Essex and Histon in Cambridgeshire have shown the influence these factories have in the successful development of fruit growing. Apples can always be sold at good prices. One smallholder makes an average price of 8s. 6d. per 40 lbs. for Allington Pippins packed in boxes, and for his best specimens he asks and obtains 20s. per case. He has in three years built up a connection which can take all the apples he can produce or buy. It is a tribute to the system that this man, now so successful, previously gave up a house and holding in another district, after spending several years and a good deal of money in planting fruit trees.

A very great deal, of course, depends on the packing. Last year Allingtons were sent to Covent Garden in half-bushel baskets, and realised 6s. per bushel of 40 lbs., a day or two later precisely similar apples were packed in boxes (provided by the salesmen) in single layers, when they realised 2s. per box of 2 dozen, a difference of approximately 4s. per bushel.

Fruit is so generally saleable that most of the smallholders devote a considerable proportion of their holdings to fruit trees and bushes. Apples, pears, plums, cherries, black currants, raspberries, and

strawberries are grown, there are some red currants, and loganberries are increasing in favour. Asparagus is being grown on several holdings, and most of the smallholders, encouraged by the successful examples, have taken up flower growing. The growth of a variety of crops not only lessens the risk of total failure in unfavourable seasons, but the income of the holder is spread more evenly over the year. The smallholder's income under such conditions begins early in May with the sale of the double arabis, closely followed by asparagus, and then in quick succession come the pyrethrums, green gooseberries, strawberries, marguerites, raspberries, plums, red and black currants, asters, apples, pears and potatoes, these last three being placed on the market gradually as favourable opportunities occur.

The holdings are neatly kept, and free from weeds, in this case example being very much better than precept. There are few unsightly huts or other buildings, as plans of every building must be approved by the surveyor before their erection can be commenced.

The wives of the smallholders are keenly interested, and there is a ladies' league—entirely democratic, not—
"The Ladies' League." withstanding its undemocratic title—which is devoting itself to the raising of funds for purchasing hand looms for rug weaving or cloth making, the final decision depending on the result of investigations which are still in progress. The league has organised a number of successful social functions, and by the time the fruit season is over the committee expect to be in possession of sufficient funds to start the industry on a satisfactory basis. One of the most successful of the league's undertakings was a cake competition, for which, among a total population of 850, there were over 80 entries.

There is an elementary school in the centre of the estate, but so far the education authorities have not seen fit to establish a school garden, although land has been offered for this purpose.

This paper is already of considerable length, or I would give full some details of the houses which have been designed and erected by the Building Department, of the Stores, which claim to supply everything for the smallholder and his household, of the system of credit loans, and of that latest institution—the Fairby Post Office—a convenience rendered necessary solely by the growth of the smallholdings industry.

So far, only the methods by which more or less direct assistance and guidance are given to the smallholder have been referred to. These methods principally
How the Dépôt Helps. resolve themselves into arrangements for securing the proper cultivation of the holdings, and the profitable marketing of the produce, and it will have been noticed

that the smallholder is able, through the agency of what is called the *Depôt* :—

1. At any time to command skilled assistance at its actual labour value.
2. To obtain advice on cultivation, marketing or account-keeping from the foreman or manager, or should this fail, from the office, which is an information bureau in close touch with cultivators of wider experience.
3. Whether the smallholder has much or little land to cultivate, his expenses can be in exact proportion to his requirements, as he need maintain no animal or implement for which he has only occasional use.
4. Whether he has much or little produce to market, his expense is proportionate to the quantity consigned. The *depôt* bulks the consignments and so effects considerable savings.
5. He need not leave his holding to market his crops.

Such an organisation has created a community intensely interested in making small holdings pay, and one in which

**Technical
Instruction.**

discussions on smallholding topics are supremely popular. It would not do, however, to rest at this point, there must be provision for continued progress, and it is because of this that the necessity for further instruction becomes apparent. The smallholders, under what one might describe as intensive instruction on their holdings, rapidly become proficient in all ordinary work. What they fail to learn from the *depôt* staff and workmen they learn from one another in frequent discussions among themselves. We want them to continue their education. A cursory survey of the history of the lighter branches of agriculture shows that some of the most profitable crops become less profitable as fashion, or the character of the demand, changes, and the successful smallholder must be ready to grow new crops and to adopt new methods when these are shown to be profitable. Like the manufacturer of textiles, he must sometimes discard old favourites, even at a sacrifice, if he is to maintain his position.

With the object of continuing the educational process and encouraging the adoption of new crops and new methods, a lecture and club room has been provided, and periodical lectures are given on subjects closely allied to the work of the smallholding. The County Horticultural Instructors have lectured on one or two occasions, but these lectures do not quite meet the need. The best way to grow plants is not always the most economical way. The in-

formation smallholders are anxious to obtain consists of facts regarding their fruit, flower and vegetable crops, such as are provided by the agricultural experiments carried out by the Department of Agriculture and Technical Instruction and by their instructors regarding farm crops, the results being given in terms of profit. Two instances occur to me of the kind of thing I mean, one was the investigation of the cost of producing store cattle, and the other on the profit to be derived from winter dairying. Very valuable lectures are occasionally given by friends who are interested in meeting smallholders on poultry, on manures and similar subjects.

The local Technical Instruction Committee have classes in a neighbouring district in lace-making, basket-making and ambulance work. In the basket-making classes the baskets made are those used for the conveyance of fruit to the markets, and as each year these returnable baskets, which spread disease and reduce the value of fruit consigned in them, are being more and more replaced by non-returnable packages and boxes, the instruction is of little use to smallholders. Instruction in ambulance work is valuable, but it would be better, we are inclined to think, if lessons were given on foods and nutritive values, and the principles of hygiene, ventilation, temperatures, and the necessity for cleanliness. Such instruction would be of value to the smallholders and their families, not only because of its effect on their personal health, but as illustrating the causes of healthy and unhealthy conditions in the growth of live-stock. At present, none of the smallholders attend the classes held under the local Technical Instruction Committee's auspices, but they meet frequently to discuss their own and other problems, they appoint committees to obtain information on special points, and they make use of a library of technical books which has been provided in the lecture room. There are no formal classes of instruction for them as it is difficult to find teachers sufficiently practical to be of real assistance. The instructors who would be really useful would be teachers who could do for the smallholders what the instructresses of domestic economy, who go into the households in Irish villages, do for the household. But such teachers are not easy to find, and the workmen who actually work on the holdings with the assistance of the smallholders and under the general direction of a skilled and experienced foreman provide a substitute.

A great need of the smallholders is some understanding of the principles of organisation and business management, and instruction on such lines would be much appreciated. The grower of crops for sale in the markets needs much business acumen, and a carefully designed course in the methods of organisation, commerce, and market methods, would be of great assistance in developing this faculty. That this is a view very generally held is evidenced by a paragraph

in the latest report of the Board of Agriculture Smallholdings Branch, in which the writer says :—

“The only certain means of increasing the prosperity of the smallholder is to increase the yield and the profits from the land, and this can only be done by education and organisation. Smallholders are still far too apt to copy slavishly the methods of cultivation adopted by the large farmers, and so long as they are content with doing that they cannot hope to make a satisfactory living. It cannot be too often repeated that the only sure hope of success for the smallholder is to encourage him to adopt new methods of cultivation, and for this purpose constant advice and guidance is needed, not only as to the best crops to grow, but also as to the best means of marketing them so that fair prices for his produce may be secured.”

This necessity for business knowledge applies particularly to smallholders who grow crops for sale and not for feeding to stock. Under the conditions to which I have referred little stock is kept,—a few pigs, a good number of hens—but it is not forgotten that the main business of the smallholder is the cultivation of the soil, and anything, such as the tending of cattle, the feeding of poultry and pigs, which diverts attention from the main object, is a source of possible danger. It is less laborious, it is even more pleasant, to give a bucketful of food to obviously grateful pigs or poultry, than to dig or manure apparently unresponsive fruit trees. With live-stock, and especially with pigs, there is always a large element of risk, and the experience of these smallholders indicates that poultry and pigs are excellent and profitable adjuncts to the small holding, but by themselves they are very uncertain in their yield of profit in any but the most skilful hands.

From the descriptions which have been given, no doubt it will be noticed that the work is a development of much that has been done in other places. The belief that formal instruction is almost impossible with men approaching middle age was due to experience with gardeners at Kingstown Technical School. Gardeners would not attend classes in gardening or botany, but they came enthusiastically to listen to lectures on gardening, and many of them took part in discussions. They were equally enthusiastic in supporting the flower show, and the amount of concentrated thought expended on the periodical meetings for discussion and on the flower show was of real educational value. This applies with equal truth to the somewhat unsystematic work of these established smallholders. I refer only to men engaged in these occupations.

It is almost surprising to find that business ability is of such great

importance. We used to be anxious to get expert gardeners on to the holdings, but our experience has been that expert gardeners are not always successful smallholders. On the other hand men who have had some business training are most successful as smallholders, they are quick to grasp the reasons for operations, and they will experiment until they find the most economical way of working—in short, they organise their holdings as they would their offices. Another very successful group consists of those who have returned from abroad. There is one such man in particular, who returned to take up five acres after farming successfully 100 acres in Canada. He now confesses that when he commenced he had doubts as to the possibility of making a living on the smaller area. Last year he obtained, as a result of his own labour, £164 from his five acres, after providing his household with all the vegetables and fruit that were needed.

Under the old system of farming, fruit, potatoes, corn, the Fairby Farm employed some seven men for each 100 acres, to-day the farm is employing twenty-five men per 100 acres, and they live under better conditions than the seven did.

It will be recognised that the system is a very simple one—manufacturers are solving much more difficult problems than the organisation of a community of smallholders—and when one hears of the efforts being made to attract capital for this and that industrial project for the rural community one wishes that the capitalists would realise that the best industrial project for any rural district is the better cultivation of the soil.

SECOND IRISH EGG-LAYING COMPETITION.**THIRD QUARTERLY REPORT.**

The following Table gives the position of the different pens on 30th June, 1914.

Order of merit.	No. of Pen.	Breed.	No. of Eggs Laid.	Value of Eggs from 1st Oct., 1913, to 30th June, 1914.
				£ s. d.
1	*45	Rhode Island Red	966	4 15 4½
2	*47	Rhode Island Red	909	4 8 6½
3	*46	Red Sussex	904	4 5 11
4	50	Rhode Island Red	865	4 5 2½
*5	25	Rhode Island Red	835	4 3 7½
6	30	White Wyandotte	821	4 1 9½
	1	Black Minorca	818	4 1 9½
8	31	White Wyandotte	856	4 0 11½
9	2	Black Minorca	798	4 0 7½
10	*44	White Leghorn	783	3 18 2½
11	35	White Wyandotte	818	3 17 6½
12	*43	White Leghorn	742	3 15 11
13	3	Black Minorca	764	3 15 8½
14	12	Buff Orpington	782	3 15 4
15	11	Buff Orpington	739	3 13 11½
16	28	White Wyandotte	754	3 13 5
17	27	White Wyandotte	786	3 12 10½
18	38	Rhode Island Red	735	3 10 9
19	7	White Leghorn	757	3 10 6½
20	5	White Leghorn	753	3 9 11½
21	14	White Orpington	727	3 9 10½
22	23	Rhode Island Red	759	3 8 4
23	29	White Wyandotte	701	3 7 9½
24	6	White Leghorn	697	3 6 10½
25	39	Rhode Island Red	701	3 6 8½
26	15	Red Sussex	688	3 6 3½
27	18	Rhode Island Red	653	3 4 4½
28	19	Rhode Island Red	661	3 3 10½
29	4	Black Minorca	642	3 3 9½
30	40	Brown Leghorn	631	3 1 5
31	13	White Orpington	691	3 1 4½
32	42	White Wyandotte	672	3 0 9½
33	33	White Wyandotte	657	3 0 8½
34	10	Brown Leghorn	675	3 0 6½
35	8	White Leghorn	651	2 19 7½
36	32	White Wyandotte	624	2 19 4½
37	37	White Leghorn	659	2 18 9½
38	41	Buff Orpington	578	2 16 4½
39	16	Light Sussex	538	2 16 1
40	26	White Wyandotte	606	2 15 10½
41	22	Rhode Island Red	617	2 15 0½
42	21	Rhode Island Red	579	2 14 9½
43	24	Rhode Island Red	623	2 14 1½
44	17	Rhode Island Red	546	2 10 5½
45	9	Brown Leghorn	574	2 10 5½
46	36	White Wyandotte	545	2 4 3½
47	20	Rhode Island Red	454	1 17 2

SECOND YEAR HENS.

1	*49	Rhode Island Red	696	3 5 7½
2	*48	Rhode Island Red	617	2 19 2

* Not competing for prizes.

L. MURPHY.

SWINE FEVER.

The Department wish to point out that if they are to succeed in suppressing Swine Fever in Ireland it is absolutely necessary that pig owners should give them every assistance in their power.

In addition to the steps which are taken by the authorities to this end, the following suggestions are offered for the guidance of pig owners.

ORIGIN OF THE DISEASE.

Like most other contagious or infectious diseases, Swine Fever is due to a very small germ which is passed from animals infected with the disease and may lie about sties, farm buildings, and yards where it may be taken up by healthy animals, and cause an outbreak of the disease.

This is especially the case where sties are not kept in a cleanly condition or where they are badly constructed, as for instance with broken floors, bad drainage, etc.

NOTIFICATION OF THE DISEASE.

The law compels every pig owner to give notice to the police of an outbreak of swine fever on his premises, and neglect to observe this rule will increase the difficulty of getting rid of this disease.

Even cases where the disease is only suspected must be similarly reported without a moment's delay.

Compensation is payable by the Department for all pigs slaughtered by their directions under the Swine Fever Order.

PRECAUTIONS AGAINST THE INTRODUCTION OF THE DISEASE.

All pigs, young or old, when newly purchased should be kept separate for at least a fortnight from those already on the premises.

No swine should be moved from any premises to other premises or to a fair or market unless the owner is satisfied that all his swine are free from the disease.

PREVENTION OF THE DISEASE.

Since Swine Fever is commonly carried by means of the feet and clothes of persons who have visited places where the disease exists, pig owners will be wise to prevent strangers from approaching un-

necessarily, and in districts where the disease exists, spayers and castrators should be required to wash and disinfect their boots with a solution of some suitable disinfectant such as a table-spoonful of carbolic acid in two quarts of water or Jeyes' Fluid used in the same strength.

The cleanliness and proper construction of the piggeries are very important ; this especially applies to the floor, which should be of some *material which liquid will not penetrate*. Where possible the walls should be cemented for two feet above the floor and free drainage provided by an open channel.

Carts, crates, nets, ropes, etc., used in the conveyance of swine should be thoroughly cleaned and disinfected immediately after use with one of the substances already named.

Pigs kept in good thriving condition in cleanly surroundings are less liable to become affected with Swine Fever than are unsuitably fed and badly-housed animals.

Copies of this article in leaflet form (No. 18 Revised) may be obtained, free of charge and post free, on application to the Secretary, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion Street, Dublin. Letters of application so addressed need not be stamped.

OFFICIAL DOCUMENTS.

I.—AGRICULTURE.

Form A. 176 (b)
1914.

Department of Agriculture and Technical Instruction
for Ireland.

AGRICULTURAL EDUCATION FOR YOUNG MEN.
Session 1914-15.

FARM APPRENTICESHIPS.

AGRICULTURAL STATION, RALLYHAISE, CO. CAVAN.

Young men who intend to become farmers in Ireland are received at the Station for one year, as apprentices, for a course of practical training in several branches of farming. Instruction in the principles of the sciences underlying ordinary farm practice is also provided.

Apprentices are admitted without payment of any fee. They are required to take part in all the operations of the fields and of the farm yard. They must perform diligently all work assigned to them on the farm. Applicants are not admitted unless they are regarded as generally fitted to discharge the duties of an apprentice.

Technical instruction in the class-room is included in the course. During the spring and summer months such instruction is given only at times when the weather is unsuitable for outdoor work. The class-room instruction is of such a character as to continue the general education of the apprentices and be useful to them in their future career as farmers. It is not intended as a preparation for any examination.

Applications for apprenticeships may be made at any period of the year.

Applicants for apprenticeships tenable during the 1914-15 session must be not less than seventeen years of age on the 1st October, 1914.

Admission as an apprentice is conditional on producing certificates of good health and character.

Subject to passing a qualifying test as to their fitness from an educational point of view to take advantage of the course at the Station, and satisfying the Department that they are physically equal to the farm work of the Station, apprentices are admitted in the order of the receipt of their applications in the Department's offices. Preference is, however, given to those applicants who produce evidence that they have sure prospects of obtaining farms of their own, or *bona fide* occupation at farming. If, in addition, such applicants have attended a course of instruction under the Department's Scheme of Winter Agricultural Classes, they are allowed priority in order of admission to the Station. It is also a recommendation if an applicant produces a certificate from an Itinerant Instructor in Agriculture that he has taken advantage of the Instructor's lectures and demonstrations and has shown a desire to improve his knowledge of tillage farming. The Department do not guarantee admission to any applicant.

An apprentice is not retained at the Station if he is found unable to perform a fair day's work or to be otherwise unsuitable.

The apprentices are required to reside in the buildings attached to the Agricultural Station, where they are under the immediate supervision of the Principal.

The course will extend from the 18th October, 1914, to the 8th October, 1915. There will be an interval of about a week at Christmas during which the apprentices may return to their homes.

Outfit.

Apprentices are required to provide themselves with a proper outfit, particulars of which are supplied to applicants when they are being notified of their admission.

A sum of £1 must be deposited with the Principal on entrance to cover the cost of repairs to clothes, the purchase of books, stationery, etc. The unexpended balance, if any, of this deposit is refunded on the termination of the apprenticeship.

Applications for Admission.

Application for admission must be made on the prescribed form, to be obtained from—

THE DEPARTMENT OF AGRICULTURE AND
TECHNICAL INSTRUCTION FOR IRELAND,
UPPER MERRION STREET,
DUBLIN.

Latest date for making application for admission to the 1914-15 Session—31st August, 1914.

DEPARTMENT OF AGRICULTURE AND TECHNICAL
INSTRUCTION FOR IRELAND.

THE ALBERT AGRICULTURAL COLLEGE,
GLASNEVIN, DUBLIN.

SESSION 1914-1915.

The Albert Agricultural College is situated on the north side of Dublin in a healthy situation about 170 ft. above the sea level. It is easily reached by tram to the Glasnevin terminus, from which it is distant less than a mile. The College consists of a residence for about sixty students, together with a farm, orchard, and gardens, all covering an area of about 180 acres.

The College provides two distinct courses of instruction—one for farmers, the other for gardeners. The former or Agricultural Course occupies in the Department's scheme of agricultural education a position intermediate between the instruction given at the Agricultural Stations and that provided by the agricultural faculty of the Royal College of Science, Dublin. The Horticultural Course is intended for selected pupils who are seeking to qualify for the post of Instructor in Horticulture. (For particulars relative to the Horticultural Course see separate leaflet, A. 153a.)

AGRICULTURAL COURSE.

This course is intended for young men who desire a technical and practical knowledge of agriculture, to fit them for entrance to the Royal College of Science, Dublin, for becoming farmers, or for engaging in any other occupation—such as creamery management—which requires technical training in the sciences underlying agriculture. It includes instruction in agriculture in the classroom, farmyard, and fields, supplemented by lessons in dairying, horticulture, poultry management, bee-keeping, and veterinary hygiene. The elements of physics, chemistry, botany, zoology, and entomology are taught so far as is necessary to the proper understanding of the principles underlying the most approved farmyard practice.

Instruction is also given in book-keeping, surveying, and wood-work, while literature, mathematics, and drawing receive such attention as is found requisite.

Every encouragement is given to the pursuit of athletics and to the development of social intercourse among the students.

The College discussion society meets frequently throughout the session. The papers read before it relate to topics of current interest to the farming community.

The library is supplied with standard works on agriculture, and copies of the best farming periodicals are procured regularly for students' use.

The Staff.—The staff consists of Principal, Agriculturist, House Masters, and teachers of chemistry, botany, zoology, veterinary hygiene, horticulture, dairying, poultry-keeping, bee-keeping, and woodwork. A competent Drill Instructor attends twice weekly to see to the physical training of the students.

The Clergy of the different denominations also visit the College weekly to give religious instruction. The domestic comfort and bodily health of the students are under the care of an experienced Matron.

The Session.—The course of study extends over a session of ten months, which for the year 1914-15 will open on Tuesday, the 13th October, 1914, and end on Friday, the 13th August, 1915. There will be two intervals, each of about a fortnight—during which students will return to their homes—one at Christmas and the other at Easter.

College Certificate.—The College certificate is awarded partly on the result of the sessional examinations, and partly on the work done throughout the year. It is of two classes, the first being reserved for those students who add to an intelligent grasp of scientific principles a high standard of skill in practical farm work.

Prizes are given by the Department for progress made, for work done, and for services cheerfully rendered to the common weal. These prizes are awarded after consultation with the Principal, and not merely on marks obtained at the examination.

Conditions of Admission.—Admission to the College is conditional on passing the entrance examination and furnishing evidence of good health and character. Only resident students who are prepared to stay the whole session and to take the full curriculum are admitted. They must not be less than 17 nor more than 30 years of age on 1st September, 1914.

The entrance examination will be held in the first week in September, 1914, at four centres situated one in each province. Each applicant for admission will be notified in due course as to the centre at which he will be required to present himself. No expenses will be allowed in respect of attendance.

The subjects included in the examination will be as follows :—

- (1.) *English*, including dictation and composition.
- (2.) *Arithmetic*, including calculations requiring a thorough knowledge of weights and measures, decimal and vulgar fractions, percentages, and interest.
- (3.) *Mathematics*.—The elements of mensuration—lengths, areas, volumes ; and algebra to simple equations.
- (4.) *Agriculture*.—The questions on this subject are framed with a view to testing knowledge acquired by practical experience of farm work. No text-book is prescribed or recommended. The examination may be oral as well as written.

Fees.—The fees for tuition, board, residence, laundry, and ordinary medical attendance during the entire session are :—

For students whose parents or guardians derive their means of living mainly from farming in Ireland, £15

For students other than the foregoing, . . . £50

The fees are payable to the Principal in two instalments, viz., one of £10 (or £80) on entrance and the balance on 1st February. In addition to the instalment of the fee payable on entrance each student must deposit with the Principal a sum of £3 to cover the cost of repairs to clothing, and of books and stationery. The unexpended balance, if any, of this deposit will be returned at the close of the session.

Outfit.—Students are required to provide themselves with a proper outfit, particulars of which will be supplied to candidates successful at the entrance examination.

Application for Admission.—Application must be made on the prescribed form, to be obtained from—

THE DEPARTMENT OF AGRICULTURE AND
TECHNICAL INSTRUCTION FOR IRELAND,
UPPER MERRION STREET,
DUBLIN.

Applications will be dealt with in the order of their receipt in the Department's Offices. They should be forwarded not later than the 15th August, 1914.

A booklet descriptive of the College and containing detailed syllabuses of the courses in the several subjects of the curriculum, may be obtained on application as above.

SUB

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 1914. F.

DEPARTMENT OF AGRICULTURE AND TECHNICAL INSTRUCTION FOR IRELAND.

NORTH-WEST AGRICULTURAL SCHOOL, STRABANE.

INSTRUCTION FOR YOUNG WOMEN.

Courses of Instruction in Poultry-keeping, Butter-making, and Domestic Economy are provided at this school.

A six weeks' course of instruction in Poultry-keeping, Cookery, Sewing, and Housewifery (including Sick Nursing), will open on the 30th June, 1914.

The course will be open to resident pupils only. Accommodation for twenty-four pupils is provided.

Applicants for admission must be not less than seventeen, or more than thirty-five years of age on the opening date of the course. Those applicants who have satisfactorily attended classes held during the year 1913, under the Department's Schemes of Instruction in Poultry-keeping or Butter-making, will receive a preference in regard to admission. Applicants must satisfy the Department that they have received sufficient general education to enable them to take advantage of the instruction provided.

Eight scholarships, entitling the holders to free instruction, board and residence during the course, are being provided by each of the County Committees of Agriculture of Donegal, Londonderry, and Tyrone, for applicants resident in their respective counties.

Applications for these scholarships should be addressed to the Secretaries of the County Committees named. Their addresses are as follows :—

- | | | |
|----------------|---|--|
| The Secretary, | Co. Donegal Committee of Agriculture, | |
| | Courthouse, Lifford ; | |
| „ | Co. Londonderry Committee of Agriculture, | |
| | Courthouse, Coleraine ; | |
| „ | Co. Tyrone Committee of Agriculture, | |
| | Courthouse, Omagh. | |

The award of scholarships will be subject to the approval of the Department.

Eligible applicants, for whom no scholarships are available, may be admitted on payment of a fee of £2. Such applicants, if resident in County Donegal, Londonderry, or Tyrone, may, if they prefer, have their names retained on the list for consideration in connection with the award of scholarships for the next similar course.

A sum of £1 must be deposited by each pupil on entrance, to cover the cost of purchase of books, stationery, etc. The unexpended balance, if any, of this deposit, will be refunded at the close of the course.

Each pupil must provide herself with a proper outfit, particulars of which will be forwarded to her with the notification of her admission.

Suitable facilities for fulfilling their religious duties are provided for all pupils, and they are under the supervision of an experienced matron.

Forms of application may be obtained from the Secretaries of the County Committees of Agriculture mentioned above, or from the Secretary, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion Street, Dublin.

Applications for admission should be made on the prescribed form not later than the 16th June, 1914. All applicants resident in any of the counties of Donegal, Londonderry, and Tyrone, should forward their applications to the Secretary of the County Committee of Agriculture of the county in which they reside.

May, 1914.

Under revision.

Scheme No. 20.

DEPARTMENT OF AGRICULTURE AND TECHNICAL INSTRUCTION FOR IRELAND.

SCHEME FOR ENCOURAGING IMPROVEMENT IN THE DAIRY CATTLE OF IRELAND.

Dairying, as well as the raising of store cattle, is one of the principal branches of agriculture in this country. It is, accordingly, of importance that the milking properties of

Irish cattle should be preserved and improved. In dairy herds the yield and quality of milk given by each cow largely determine whether the animal realises a profit or entails a loss to the owner; consequently, it is essential that farmers should know exactly the quantity and quality of milk which each cow yields per annum. At the same time, as young cattle are a considerable source of revenue, it is desirable that the good milking cow should be of the type likely to produce a calf which will be of value for both beef and milk. With this object the Department, since 1909, have been encouraging the formation of Cow-Testing Associations.

COW-TESTING ASSOCIATIONS.

All owners of dairy cows are strongly advised to join cow-testing associations, or, if there is no association in their districts, to help where practicable to form such an association. Cow-testing associations enable their members not only to ascertain the quantity but also the quality of the milk yielded by each of their cows, and thus make it possible to determine which cows are worth retaining in a herd and which should be disposed of.

These associations are solely responsible for the correctness of the records kept by their members. In this connection it should be borne in mind that the value of a herd with records or of a young bull from a registered cow will depend mainly on the degree of confidence which other farmers place in the breeder's figures. This fact should induce farmers to bestow special care on the keeping of their milk records.

1. The Department are prepared to consider applications for the attendance of a lecturer at meetings of farmers to explain the objects and advantages of cow-testing associations. It is desirable that associations which are to come into operation in the beginning of any year should be formed as soon as possible after 1st November preceding. Applications will be dealt with in the order in which they are received.

2. A cow-testing association formed for the purpose of this scheme will, in order to be eligible for recognition by the Department, be required to undertake to comply with the following conditions:—

(a) To secure an entry of as many herds of milking cows as possible, each member being required to enter all his cows. No association will be recognised unless milk records for at least 100 cows are kept throughout the year by members of the association.

(b) To admit to membership all dairy farmers (cow owners) in the district served by the association. An association may, however, refuse to admit any person to membership, provided

the association satisfies the Department as to the reason for such exclusion.

(c) To secure that the members shall have the milk of each cow weighed on every seventh day (the exact day of the week for each member being fixed by the association). The morning and evening milk shall be weighed and recorded separately on the byre record (Form A. 291) which will be provided by the Department.

(d) To arrange that, after every weighing, a sample of each cow's milk shall be taken and preserved until the end of the month, and that the composite sample for the month shall be tested for butter-fat.

(e) To appoint a competent supervisor whose duties shall be (i.) to ensure that the weekly records are properly kept, and to transfer them each month from the byre records to the monthly statements (Form A. 288) provided by the Department, (ii.) to carry out regularly the monthly butter-fat tests, (iii.) to record in the monthly statements the results of these tests, the calculated number of pounds of butter-fat contained in the milk and the value of such milk, (iv.) to investigate all cases of abnormal weights and tests, and take special samples to check same, (v.) to certify all particulars in respect of any cows submitted by members of the association for entry in the Department's Register, and (vi.) to prepare an annual statement of the work of the association on the prescribed form and to send a copy of such statement to the Department.

(f) To provide all apparatus, chemicals, etc., necessary for testing the samples of milk and to pay the supervisor at the rate of at least threepence per cow per monthly test.

(g) To permit the Department at any time to inspect the byre records, monthly statements, list of members, etc., as well as the milking of the cows and the testing of the milk samples.

3. When the Department are satisfied that a cow-testing association has been formed, and that suitable arrangements have been made to comply with the foregoing requirements, they will be prepared (a) to supply the society with the necessary number of byre records and forms of monthly statement, and (b) for one year to contribute to the association at the rate of twopence per cow per monthly test towards the cost of employing a supervisor. The subsidy referred to at (b) will not be payable until the Department are satisfied that all requirements have been complied with.

Registration of Cows.

4. The Department will keep a Register of dairy cattle in which cows and their progeny may be entered subject to the

provisions of this scheme. The inspection of cows with a view to entry on the Register will be carried out by the Department.

5. The Department, on receiving payment of a fee of *2s. 6d.* for each cow, will be prepared to inspect at such centres as may be determined by them all cows which have given, during the milking period covered by the records, a yield of not less than 210 lbs. of butter-fat, provided that the calculated average percentage of butter-fat in the milk does not fall below 8 and the calculated yield of milk below 6,000 lbs. The Department will accept for entry in the Register all such animals which as a result of inspection they consider to be of good conformation and well-defined type. The fees will be refunded in respect of cows which are rejected.

Applications for the inspection of cows should be made to the Department on the prescribed form (A. 416) not later than 12th December, and should be accompanied by a certified record of the milk yield of each cow for a complete milking period (See clause 9.)

6. The owner of each registered cow will be required to comply with the following conditions :—

(a) To have the animal served by a registered dairy bull or a pure-bred bull, of her own type, which has been passed by the Department as up to premium standard ;

(b) To furnish to the Department on the prescribed form (A. 66) within seven days from the date of birth, particulars regarding sex, colour, markings, etc., of each calf produced by a registered cow, and such particulars of the sire and dam as the Department may require ; and

(c) To keep on the prescribed form (A. 79) a record of the breeding, date of birth, etc., of progeny, for the purposes of future registration. This record must be open to inspection at any time by the Department.

7. When a registered cow or her calf has been disposed of, the Department must be notified of the fact within fourteen days of the disposal of the animal, and at the same time advised of the name and address of the new owner.

The death of a registered cow or her calf must also be notified to the Department within fourteen days of the death of the animal.

Failure to observe this regulation may entail the removal from the Register of the animals entered in the name of the person in default.

8. In cases where the conditions of clauses 6 and 7 have been fully complied with, male progeny will be eligible for inspection with a view to provisional selection for premiums under the Department's Cattle Breeding Scheme, within the limits of

age specified therein, and, if so selected, will be entered in the Register as "Registered Dairy Bulls."

Owners of male progeny eligible for inspection should apply on the prescribed form in the month of December for a certificate of eligibility, and for particulars of the show or centre at which the animal should be exhibited for inspection.

General.

9. For the purposes of this scheme the term "milking period" shall mean the period during which a cow continues to yield milk after calving. Provided that if such period exceeds 45 weeks the first 45 weeks after calving shall be regarded as the cow's milking period.

10. The Department reserve the right, without assigning any reason for their action, (a) to remove the name of any animal from their Register, and (b) to refuse to inspect or register any cow or the progeny of any registered cow.

11. The Department also reserve the right to modify or withdraw this scheme in whole or in part at any time.

12. In all cases of dispute in matters connected with this scheme the decision of the Department shall be final.

March, 1914.

DEPARTMENT OF AGRICULTURE AND
TECHNICAL INSTRUCTION FOR IRELAND,
UPPER MERRION STREET,
DUBLIN, *June, 1914*

No. A. 9808—14.—*Circular.*

TO THE PROPRIETORS AND MANAGERS OF IRISH CREAMERIES.

GENTLEMEN,

The Department consider it desirable to direct the attention of creamery proprietors and managers to certain complaints regarding the marketing of Irish creamery butter and other dairy produce which were brought to the Department's notice during the past year.

The principal complaints made regarding the packing of Irish creamery butter were:—

- (1.) That in some cases the 56-lb. pyramid boxes were constructed of badly seasoned and roughly-finished wood,

with the result (a) that the timber did not hold the nails firmly and withstand the hardships of transit, and (b) that boxes of Irish creamery butter presented an uninviting appearance as compared with boxes of foreign and colonial butter.

- (2.) That as the boxes and parchment were not properly prepared, a considerable quantity of butter adhered to the parchment, and the exterior of the butter was flavoured by the wood.
- (3.) That when the packages were kept in store for a few days moulds developed on the parchment, giving the butter a most objectionable appearance, and lowering its market value.

In order to avoid the first of the foregoing defects creamery proprietors are advised to insist upon being supplied with boxes which comply strictly with the Department's specifications. Packages constructed of unseasoned wood, or of wood badly planed and finished, should not be accepted.

The second defect may be avoided if the package itself and the parchment used are prepared in the manner indicated in the Department's Leaflet No. 60, "Packing of Butter."

With regard to the third defect, the Department desire to draw special attention to the importance of using a butter parchment of good quality for the lining of butter packages. Samples of parchment in use at several Irish creameries were taken by the Department during last year, and tested for sugar, with the result that in some cases, the parchment was found to be loaded with from 7·8 per cent. to 12·6 per cent. of sugar. Sugar in parchment acts as a food material for moulds, and encourages their growth, and it is, consequently, most important, when butter parchment is being ordered, to specify that it must be free from sugar and all other loading material.

Another complaint to which the attention of the Department was drawn last year is that during the summer months Irish creamery butter is received in the markets in Great Britain in an overheated condition, and showing much loose moisture. The butter is, in this respect, seriously handicapped as compared with foreign and colonial butters, which are forwarded to the markets in cold stores on the steamships, and in cooled wagons on the railways. To secure that Irish butter will reach the markets in good condition during the hot weather it is most important that the cream should be properly cooled after separation, and before being churned, and also that the butter should be chilled at the creamery before shipment. The advantage of a refrigerating plant, submerged coils, and cold store, as compared with the use of ice at a creamery for this purpose is considerable. In hot weather butter should be placed in a cool store (temperature about 40° F.) for from twelve to twenty-four hours before it is sent from the creamery. The Department, however, desire to impress upon creamery proprietors and manager that cold stores at creameries which are intended only for the thorough chilling of freshly-made butter should not be utilised for retaining butter for any considerable time with a view to a rise in the market quotations. The deterioration of the quality of the butter so stored will adversely affect the reputation of the creamery among

its customers. Cooled railway vans provided for the cold transit of butter and facilities for cold storage in steamships should be availed of as widely as possible, but the use of such conveyance will not be effective if the butter is in a heated condition when it leaves the creamery.

In winter it is also found that much of the butter is not worked sufficiently to mix the salt thoroughly, and, as a consequence, the butter is frequently mottled or "marbled" after standing for a few days, and shows a considerable amount of loose moisture.

Delays in transit should, as far as practicable, be avoided by ascertaining from the representatives of the various carrying companies the quickest route from the creamery to the buyer in Great Britain, and the exact period occupied in transit. Care should be taken to fill in the route on the consignment note and label, and to communicate with the carrying companies at the opening of the season in regard to the arrangements to be made for the transit of butter. The consignee should be notified of the route by which the butter is forwarded with a view to enabling him to make enquiries in case of delay, and to secure delivery in time for the market. Further, where an exhibit of butter is consigned, especially by passenger train, to any of the English shows, it is recommended that in order to prevent damage and to ensure the arrival of the package in good condition it should be enclosed in a non-returnable outer covering, such as a hamper.

With reference to the marketing of Irish milk and cream in Great Britain, complaints have been made to the Department that proprietors and managers of creameries do not always return to their respective owners the railway cans supplied by purchasers, and that in many cases vessels belonging to one customer are used for conveying milk and cream to other firms which may be in competition with the owners of the cans. This procedure is most unbusinesslike, and should be discontinued.

It is recommended that when contracts for the sale of milk and cream are being made, purchasers should be asked to provide cans, and that such vessels should be well washed, scalded, and cooled before being filled at the creamery, and returned to customers without undue delay.

I am,

Gentlemen,

Your obedient servant,

T. P. GILL,

Secretary.

DEPARTMENT OF AGRICULTURE AND TECHNICAL INSTRUCTION FOR IRELAND.

DESTRUCTION OF NOXIOUS WEEDS.

The Weeds and Agricultural Seeds (Ireland) Act, 1909, provides that occupiers of land who, after being duly notified to destroy noxious weeds, such as thistles, ragwort, and docks, growing thereon,

neglect to do so, may be prosecuted. Farmers and occupiers of land generally are for the most part alive to the harm done to agriculture by the spread of these weeds and the necessity accordingly of arranging for their destruction before they seed. Some occupiers, however, for various reasons, are still negligent in this matter. Now that the Act has been in operation in the great majority of Irish counties for a number of years, it is understood that prosecutions will in future be instituted without warning in cases where notices to destroy weeds are not complied with within the prescribed period.

Leaflets explaining the best way of eradicating various classes of Weeds may be obtained on application to The Secretary, Department of Agriculture and Technical Instruction for Ireland.
4 Upper Merrion Street, Dublin.

II.—TECHNICAL INSTRUCTION.

SUMMER COURSES OF INSTRUCTION FOR TEACHERS.

The fourteenth series of Summer Courses, organised by the Department of Agriculture and Technical Instruction for Ireland, for teachers in Technical, Secondary and National Schools, opened on the 7th July at various centres in Dublin and throughout the country, and continue until the 31st July. The total number of teachers attending the Courses this year is 712 whilst the teaching staff engaged numbers 87.

PARTICULARS OF THE COURSES AND TEACHING STAFF.

The following courses are being held at the Royal College of Science :—

COURSES IN EXPERIMENTAL SCIENCE.

These Courses are attended by Teachers in Secondary Schools, and instruction is given in Physics, Chemistry, Botany and Physical and Commercial Geography. The several courses are conducted by :—

Professor Grenville A. J. Cole, F.G.S., M.R.I.A. (Dean and Professor of Geology, Royal College of Science for Ireland); Professor W. Brown, B.Sc., M.I.E.E. (Professor of Applied Physics, R.C.Sc.I.); Mr. R. G. Allen, B.Sc., A.R.C.Sc.I. (Demonstrator in Electro-Technology, R.C.Sc.I.); Mr. G. J. T. Clappett (Commercial Instructor, Municipal Technical School, Tralee); Mr. J. A. Clarke, B.A., M.B. (Demonstrator in Biology, R.C.Sc.I., and Professor of Botany and Zoology, Royal Veterinary College for Ireland); Mr. F. E. W. Hackett, M.A., M.Sc., Ph.D. (Lecturer in Physics, R.C.Sc.I.); Mr. A. G. G. Leonard, B.Sc., Ph.D., A.R.C.Sc.I. (Head Teacher, Chemistry Division, Crawford Municipal Technical Institute, Cork); Mr. W. J. Lyons, B.A., A.R.C.Sc. (Lond.), (Demonstrator in Physics, R.C.Sc.I.), Mr. A. O'Farrelly, M.A. (Lecturer on Organic Chemistry, R.C.Sc.I.); Mr. G. A. Watson, A.R.C.Sc.I. (Science Master, Clongowes Wood College, Sallins); and Mr. A. Williamson, M.A. (Principal, Municipal Technical Institute, Rathmines), assisted by Miss B. McI. Blair (Science Teacher, Girls' School, Dungannon); Mr. W. D. Douglas, A.R.C.Sc.I.

(Assistant Demonstrator in Physics, R.C.S.C.I.); Mr. J. Enright, B.A., M.Sc. (Assistant Science Teacher, City of Dublin Technical Schools, and Professor of Mathematics, St. Patrick's Training College, Drumcondra); Mr. R. Fleming, A.R.C.S.C.I. (Science Teacher, Church of Ireland Training College, Dublin); Mr. W. D. Haigh, B.A., A.R.C.S.C.I. (Demonstrator in Geology, R.C.S.C.I.); Mr. G. Hanlon, M.A., B.Sc. (Science Teacher, Wesley College, Dublin); Mr. D. Hayes, M.A., B.Sc., A.R.C.S.C.I. (Science Teacher, Municipal Technical School, Blackrock, Co. Dublin); Miss A. Hemphill, A.R.C.S.C.I. (Science Teacher, High School, Cork); Mr. W. D. Horgan, B.A., Science Teacher, Belvedere College, Dublin); Mr. W. R. Johnston, B.A., A.R.C.S.C.I. (Principal, Municipal Technical School, Banbridge); Mr. R. V. Manning, A.R.C.S.C.I. (Science Teacher, Royal Academical Institution, Belfast); Mr. E. Moynihan, A.R.C.S.C.I. (Science Teacher, St. Vincent's College, Castleknock, and Assistant Science Teacher, City of Dublin Technical Schools); Mr. H. Norminton, M.Sc. (Science Teacher, St. Andrew's College, Dublin); Mr. P. O'Connor (Instructor in School Gardening, D.A.T.I.); Mr. F. Rawson, A.R.C.Sc. (Lond.) (Science Teacher, St. Andrew's College, Dublin); and Mr. J. Reilly, B.A., M.Sc., A.R.C.S.C.I. (Assistant Demonstrator in Chemistry, A.R.C.S.C.I.).

COURSE IN CHEMICAL MANUFACTURES.

This Course, intended primarily for teachers of Chemistry in Technical Schools, will include a treatment of typical examples of the principal metallurgical and manufacturing processes in use at the present time. The course will be conducted by Mr. J. H. POLLOK, D.Sc., M.R.I.A. (Lecturer on Physical and Metallurgical Chemistry, R.C.S.C.I.), assisted by Mr. J. H. Cooke, A.R.C.S.C.I. (Research Student, R.C.S.C.I.), and Mr. J. Griffiths, B.Sc. (Science Teacher, Grammar School and Technical School, Larne).

COURSES IN MANUAL TRAINING (WOODWORK).

These Courses are intended for Secondary School Teachers who will receive instruction in Drawing in addition to instruction in the use of Woodworking tools. The course is conducted by Mr. H. O. Armstrong (Principal, Municipal Technical School, Tralee) assisted by Mr. W. B. Jamison (Principal, Municipal Technical School, Carrickfergus).

COURSE FOR TEACHERS OF INTRODUCTORY ENGLISH AND MATHEMATICS IN TECHNICAL SCHOOLS.

This course is attended mainly by National School Teachers who give instruction as indicated in Technical Schools. The object of the Course is to indicate to such teachers the nature of the specialised instruction which will be subsequently taken up in succeeding sessions by their students, who are mainly of the Engineering and Building Trades types. Instruction will be given in Mechanical Drawing, Practical Geometry and Workshop Mathematics, and lectures will be given on the Technology of materials, on the source, manufacture, and general properties of selected materials, also on the steam engine and on some workshop practices. The course will be under the direction of Mr. G. E. Armstrong, M.Sc. (Principal, Municipal Technical School, Londonderry), who will be assisted by Mr. O. S. Spokes, Science Teacher in the same institution.

COURSES IN OFFICE ROUTINE AND BUSINESS METHODS.

Instruction will be given in Business Methods and the keeping of accounts, in the methods of calculation used in commercial life, and in the routine methods and operations common in office work. The course is attended by teachers of elementary commercial subjects in Technical Schools and will be conducted by Mr. E. Daly (Principal, Municipal Technical School, Drogheda), assisted by Mr. W. Scott (Instructor in Commercial Subjects, D.A.T.I.).

COURSES FOR MANUAL INSTRUCTORS.

Classes will be held in Practical Mathematics and Mechanics, Handrailing, and Manual Training (Metal Work). The courses are intended for the further training of Manual Instructors who have attended the special training courses conducted by the Department, and for other teachers of Building Trades subjects. The teaching staff includes Mr. W. Davidson Head of Building Trades Department, Municipal Technical Institute, Belfast), Mr. J. G. Edwards, A.M.I.M.E. (Principal, Municipal Technical School, Portadown), Mr. P. F. Gillies, B.Sc. (Principal, Municipal Technical School, Ballymena); Mr. F. W. Warwick, B.A., B.E., A.R.C.Sc.I. (Demonstrator in Engineering, R.C.Sc.I.) and Mr. R. J. England, A.R.C.Sc.I. (Assistant Demonstrator in Engineering, R.C.Sc.I.)

COURSES IN HYGIENE AND SICK NURSING.

Intended for Domestic Economy Instructresses and District Nurses who may desire to give instruction in the subject under local schemes of technical instruction. The purpose of the course is to afford further practical knowledge of the laws of health and of home nursing, so as to enable the students to introduce simple and well-directed instruction in these subjects into their teaching. The courses are under the direction of Mrs. Ella Webb, M.D. (of Dublin), and Miss Marion Andrews, M.D. (of Belfast), assisted by Miss M. J. M. Stewart, B.A., A.R.C.Sc.I. (Queen's University, Belfast), and Nurse A. M. McDonnell (Women's National Health Association).

The following courses are being held at the Metropolitan School of Art, Dublin:—

COURSE IN DRAWING AND MODELLING.

Intended for Teachers in Secondary Schools who wish to become teachers of Drawing, but who are unable to obtain facilities during the school session, for instruction and practice under fully qualified teachers. This course will be conducted by the staff of the Metropolitan School of Art.

COURSE IN LIFE DRAWING AND FIGURE COMPOSITION.

Intended for Art Teachers in Schools of Art and Technical Schools and for Advanced Art students. Opportunities will also be given, if desired, for study in the National Museum of Science and Art. The course will be directed by Mr. W. Orpen, A.R.A., R.H.A., R.P.S., assisted by members of the staff of the Metropolitan School of Art.

COURSE IN LITHOGRAPHY.

For Art Teachers in Schools of Art and Technical Schools. The course will include lectures on the materials used, on the mixing

of colours, etc., and practical work—drawing on stone, transferring, printing by means of hand press, etc. Course under the direction of Mr. F. Ernest Jackson, teacher of Lithography at the Central School of Arts and Crafts, Southampton Row, London.

COURSE IN COLOURED EMBROIDERY.

This course, also intended for Art Teachers in Schools of Art and Technical Schools, will include instruction in the requisites for Embroidery, materials and objects suitable for embroidery upon, and the different stitches used in Embroidery. Course under the direction of Miss G. E. Atkinson, A.R.C.A. (London), teacher of Embroidery at the Municipal Technical Institute, Belfast.

COURSE IN APPLIED DESIGN.

Intended for teachers of such crafts as Painters' and Decorators' Work, Lithography, Millinery, Cabinet Making, Woodcarving, etc. Instruction will be given in the proper use of ornament ; the adaptation and treatment of forms according to their several requirements, etc. The course will also include study in the National Museum of Science and Art under the supervision of the Instructor-in-charge, Mr. Amor Fenn, teacher of Applied Design in the Goldsmiths' College School of Art, New Cross, London.

COURSE IN WEAVING.

This course, which is being conducted, upon behalf of the Department, by the Managers of the Municipal Technical Institute, Belfast, is arranged for Art Teachers in Schools in damask-producing districts. It will include lectures on the treatment of flax, its properties, and conversion into yarn ; on plain weaving and methods of production of patterns ; on Damask ; on mechanism ; on standard sizes, etc. ; and will also include practical work in weaving with hand looms and power looms, and on card-cutting machines. The course is under the direction of Professor F. Bradbury, Head of the Textile Department in the Institute.

COURSES IN ADVANCED DRESSMAKING AND ADVANCED COOKERY.

Intended for the further training of Domestic Economy Instructresses employed under local schemes of Technical Instruction. The courses will be conducted at the Irish Training School of Domestic Economy, Kilmacud, Stillorgan, Co. Dublin, under the direction of Miss R. Perkins (Teacher of Needlework and Dressmaking in the Training School), and Mrs. McCarthy Judd (Teacher of Cookery in the Pembroke Technical Schools, Ringsend and Ballsbridge).

COURSE OF INSTRUCTION FOR TEACHERS OF LACEMAKING, CROCHET WORK AND SPRIGGING.

The object of the course is to improve existing kinds of work, and not to introduce new forms, and will include instruction in Carrickmacross Lace-making, Limerick Lace-making, Crochet Work (Clones and Raised), Crochet Point, and Sprigging. The lessons on each of these subjects will include practice in drawing and design and the preparation of working tracings, also instruction in technique and the use of suitable materials. The course will be held at the Department's "Industrial Annexe," near Harcourt Terrace, Dublin,

under the direction of Mr. H. Houchen, A.R.C.A. (Lond.), (Headmaster, Municipal School of Art, Londonderry) assisted by Mrs. K. Breton (Teacher of Lacc-making, Crawford Municipal School of Art, Cork); Mrs. M. M'Menamin (Teacher of Crochet Work, Co. Donegal Technical Instruction Committee); Miss A. M'Menamin (Teacher of Sprigging, Co. Donegal Technical Instruction Committee) and Miss S. A. Reynolds (Assistant Teacher of Design, Crawford Municipal School of Art, Cork).

COURSES IN RURAL SCIENCE (INCLUDING SCHOOL GARDENING).

These courses will not begin until the 4th August and will close on the 28th August. They are held for the purpose of training National School Teachers to give instruction in the Programme in Rural Science (including School Gardening), issued by the Commissioners of National Education. The instruction will be given partly in the Royal College of Science for Ireland and partly in the School Gardens at the Albert Agricultural College, Glasnevin, and the Municipal School Garden, Eden Road, Kingstown. The teaching staff includes Professor G. H. Carpenter, B.Sc. (Professor of Zoology, R.C.SC.I.), Professor I. Swain, B.A., A.R.C.SC.I., M.R.I.A. (Professor of Geology and Geography, University College, Cork); Mr. D. Houston, F.L.S. (Lecturer on Agricultural Biology, R.C.SC.I.), Mr. L. J. Humphrey (School Gardening Organiser, D.A.T.I.), Mr. P. O'Connor, A.R.C.SC.I. (Instructor in School Gardening, D.A.T.I.); Mr. R. L. Valentine, A.R.C.SC.I. (Research Student, R.C.SC.I.), and Mrs. Wright, A.R.C.SC.I.

The foregoing courses are all directly administered by the Department of Agriculture and Technical Instruction for Ireland. Other Courses are conducted at Convent Centres for teachers who are members of enclosed religious Orders, whilst the authorities of the Christian Brothers have arranged for courses for members of that Order.

Courses will be held in Experimental Science and in Drawing and Modelling similar to the courses conducted by the Department, whilst instruction will also be given, in other courses, in Domestic Economy to enable teachers to secure recognition from the Department as teachers of Domestic Economy in Secondary Schools, and a course in Commerce has been arranged to afford training in the new Commercial Course included in the Programme of the Intermediate Education Board.

The following are the courses to be held at local centres:—

Ballyshannon: Convent of Mercy.—Course in Drawing and Modelling. Instructress: Miss Dorothy Mackey (Art Teacher, Municipal Technical School, Coleraine).

Belfast: Dominican Convent, Falls Road.—Course in Elementary Physics. Instructor, Mr. F. C. Finlay, B.A. (Science Teacher, Mercantile College, Belfast).

Blackrock (Co. Cork): Ursuline Convent.—Course in Domestic Economy. Instructress, Miss M. Saunders (Domestic Economy Instructress, Municipal Technical School, Clonmel).

Blackrock (Co. Dublin): Dominican Convent, Sion Hill.—Course in Domestic Economy. Instructress, Miss K. E. Warren (Domestic Economy Instructress, Municipal Technical School, Kingstown).

Bruff (Co. Limerick): St. Mary's Convent.—Course in Elementary Physics and Chemistry. Instructor, Mr. Brice Moore, B.A., LL.B. (Principal, Academic Institution, Banbridge).

Cabra (Co. Dublin): St. Mary's Dominican Convent.—Course in Elementary Physics and Chemistry. Instructress, Mrs. M. Thompson, M.A., Alexandra College, Dublin.

Cashel: Presentation Convent.—Course in Domestic Economy.

Dublin: Christian Brothers' Schools, Marino.—Course in Elementary Physics. Instructor, Rev. Brother P. V. Ryan, assisted by Rev. Brother M. C. Wall.

Dublin: Christian Brothers' Schools, N. Richmond Street.—Course in Elementary Chemistry. Instructor, Rev. Brother J. D. Crowley, B.A., M.Sc.

Fermoy: Loreto Convent.—Course in Elementary Physics. Instructor, Mr. G. E. Ebrill, B.A. (Professor of Chemistry, Royal Veterinary College of Ireland).

Galway: Dominican Convent.—Course in Domestic Economy. Instructress, Miss J. F. E. Walsh, B.A. (Domestic Economy Instructress, Municipal Technical School, Londonderry).

Lisburn (Co. Antrim): Convent of the Sacred Heart of Mary.—Course in Drawing and Modelling. Instructor, Mr. D. Gould (Art Teacher, Municipal School of Art, Belfast).

Monaghan: St. Louis Convent.—Course in Commerce. Instructor, Mr. J. G. M'Guigan (Principal, Municipal Technical School, Armagh). Course in Drawing and Modelling Instructor, Mr. P. L. Squire) Art Teacher, City Technical School, Kilkenny).

Mullingar: Loreto Convent.—Course in Domestic Economy. Instructress, Miss M. Darling (Domestic Economy Instructress, Municipal Technical School, Lurgan).

Newtownbarry (Co. Wexford): St. Mary's Convent.—Course in Domestic Economy. Instructress, Miss A. T. Barry (Domestic Economy Instructress, Municipal Technical School, Blackrock), assisted by Mother M. Aloysius Casey.

Rathfarnham (Co. Dublin): Loreto Abbey.—Course in Elementary Physics. Instructor, Mr. T. A. W. Hill, B.Sc. (Principal, Municipal Technical School, Blackrock).

Waterford: Ursuline Convent.—Course in Elementary Physics. Instructor, Mr. B. O'Shaughnessy, A.R.C.Sc. (Lond.), (Principal, Central Technical Institute, Waterford), assisted by Sister M. Declan Linehan.

Form S. 196.

DEPARTMENT OF AGRICULTURE AND
TECHNICAL INSTRUCTION FOR IRELAND,*
UPPER MERRION STREET, DUBLIN.

TRAINING OF TEACHERS OF CROCHET-WORK AND SPRIGGING.

The Department will, in September, 1914, award not more than three Scholarships, tenable at the Training School for Lace and Sprigging Teachers, Enniskillen, to girls having a satisfactory general education, and some proficiency in Crochet-work or Sprigging.

These Scholarships are granted to enable the holders to secure training as teachers of Crochet-work or Sprigging.

The Scholarships will be of the value of £25 each, and will be tenable for one year. The Department reserve the right to determine a Scholarship at any time upon being satisfied that its continuance is for any reason undesirable.

Each candidate for a Scholarship will be required to submit to the Department, with the form of application, specimens of her work in either Crochet-work or Sprigging.

Should the work submitted be regarded as of a satisfactory standard, the candidate will be admitted to an examination which will consist of simple tests in English, Arithmetic, Drawing, and Crochet-work or Sprigging.

The Scholarship will be awarded as a result of the examination. (Not more than one Scholarship will be awarded in the case of candidates from any one County.)

The examination will be held at the Metropolitan School of Art, Dublin, and at the Technical School, Enniskillen, on the following dates :—

Dublin.—Crochet-work or Sprigging, on Tuesday, 8th September.
English, Arithmetic and Drawing, on Wednesday, 9th September.

Enniskillen.—English, Arithmetic and Drawing, on Wednesday, 9th September.
Crochet-work or Sprigging, on Thursday, 10th September.

Candidates will be required to defray their own expenses in attending the examination.

Candidates must be at least 20 years of age on the 1st September, 1914, and must have been born in Ireland or have resided in the country for three years immediately preceding that date.

Two Certificates of good character will be required from all applicants, and selected candidates will be required to produce a medical certificate of health and an authenticated copy of certificate of birth.

The decision of the Department in regard to the selection of candidates or to any other question arising out of these Scholarships will be final.

Application must be made not later than the 21st August on Form S. 197, copies of which may be had from the Secretary, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion Street, Dublin. Two specimens of finished work, and two specimens of work in progress must accompany such application.

Only those applications received at the Offices of the Department by Saturday, August 22nd, 1914, will be taken into consideration.

Form S. 248.

Examination of Works.
DEPARTMENT OF AGRICULTURE AND
TECHNICAL INSTRUCTION FOR IRELAND,
UPPER MERRION STREET,
DUBLIN, *July*, 1914.

SIR, OR MADAM,

With reference to the Finished Studies in Art required to be submitted by Candidates for the Art Teachers' Certificate, I have

to direct your attention to the terms of Form S. 240, and to point out that it will be necessary for the works executed for this purpose by students of the above-named school during the past academic year to be submitted to the Department not later than the 30th September.

Copies of the forms and labels prescribed for use in connection with the forwarding of these works may now be obtained upon application to the Offices of the Department. Each application should state the probable number of works to be submitted.

I am,

Sir, or Madam,

Your obedient Servant,

T. P. GILL,

Secretary.

III.—FOOD AND DRUGS.

(TENTH LIST.)

DEPARTMENT OF AGRICULTURE AND TECHNICAL INSTRUCTION FOR IRELAND.

BUTTER AND MARGARINE^YACT, 1907.

(Section 8 and 14 (1).)

LIST OF NAMES APPROVED BY THE DEPARTMENT FOR USE IN CONNECTION WITH MARGARINE.

NOTE.—Approval by the Department authorises the use of the name in Ireland only. Approval does not confer on any person any exclusive right to the use of the name, nor authorise its use by any person not entitled to use it.

Ardel.
Banana.
Invenit.
Ixi.
Lusnut.
Morning Glory.
Rozo.
Silver Sea.

OFFICES, 4 UPPER MERRION STREET,
DUBLIN, 30th June, 1914.

NOTES AND MEMORANDA.

A meeting of the Agricultural Board was held at the Offices of the Department, Upper Merrion Street, on Wednesday, 1st July, 1914. The following were present:—The Right Hon. T. W. Russell, P.C., M.P., Vice-President of the Department (in the Chair);

Meeting of the Agricultural Board. Mr. Alexander L. Clark, J.P.; Sir Josslyn Gore Booth, Bart., D.L.; Most Rev. Denis Kelly, D.D., Lord Bishop of Ross; Mr. John S. F. McCance, J.P.; Mr. George Murnaghan, J.P.; Mr. David L. O'Gorman, J.P.; and Mr. P. J. O'Neill, J.P.

Mr. T. P. Gill, Secretary of the Department; Mr. J. R. Campbell, B.Sc., Assistant Secretary in respect of Agriculture; Mr. J. S. Gordon, B.Sc., Deputy Assistant Secretary and Chief Agricultural Inspector; M. J. D. Daly, M.A., Chief Clerk; Mr. T. Butler, Superintendent of the Statistics and Intelligence Branch; Mr. J. P. Walsh, Clerk in Charge of Accounts; Mr. H. G. Smith, LL.D. (who acted as Secretary to the meeting); and Mr. J. V. Coyle, were also present.

The Board had under consideration the County and other Schemes for the year 1914-15, together with the Department's Estimates of the amounts required for the different services. The schemes were approved, and the Board concurred in the financial arrangements proposed. The Board had also under consideration certain matters relating to Fisheries administration.

A meeting of the Board of Technical Instruction was held on Tuesday, the 9th June, 1914, at the Offices of the Department, Upper Merrion Street, Dublin. The following were present:—The Right Hon. T. W. Russell, P.C., M.P., Vice-President of the Department, in the Chair; Mr. James Crozier, J.P., V.S.; Mr. Christopher J. Dunn, J.P.; Rev. Henry Evans, D.D., M.R.I.A., F.I.H.; Rev. T. A. Finlay, M.A.; Sir John Barr Johnston, J.P.; Mr. William Macartney, J.P.; Alderman S. T. Mercier, J.P.; The Most Rev. Richard A. Sheehan, D.D., Lord Bishop of Waterford and Lismore; Mr. Richard Sisk, Mr. Alexander Taylor, and Mr. William Wallace, J.P.

Mr. T. P. Gill, Secretary of the Department; Mr. George Fletcher, F.G.S., Assistant Secretary in respect of Technical Instruction; Mr. J. D. Daly, M.A., Chief Clerk; Mr. T. Butler, Superintendent of the Statistics and Intelligence Branch; Mr. H. G. Smith, LL.D. (who acted as Secretary to the Meeting); and Mr. A. Kelly, were also present.

The following resolution was proposed by the Most Rev. Dr. Sheehan, Lord Bishop of Waterford, and seconded by Mr. Christopher J. Dunn, J.P., Cork, and was passed unanimously :—

“That the Board of Technical Instruction at their first meeting since the death of their colleague, Sir James Henderson—an esteemed and active member of the Board since its establishment, and Chairman of the Library and Technical Instruction Committee of the County Borough of Belfast—desire to place on record their appreciation of the eminent services which he so freely rendered to the cause of technical instruction in Ireland; and their sense of the loss which the Board, the Department and the country have suffered by his death. They desire to offer their sincere sympathy to Lady Henderson and family.”

Technical Instruction schemes in respect of the Session 1914-15 for the Urban Districts of Ballymoney, Banbridge, Birr, Holywood, Lisburn, Portadown and Rathmines, and for the Counties of Armagh, Cork, Donegal, Fermanagh, Galway, Kerry, Leitrim, Limerick, Longford, Louth (1913-14), Mayo, Queen's County, Sligo, Tyrone and Westmeath were considered. The schemes were approved, and the Board concurred in the allocation of grants in aid thereof from the funds of the Department.

The following, among other matters, were also under consideration :—Summer Courses for Teachers; Higher Schools of Domestic Economy; Courses of Training for Manual Instructors; and Industrial and Commercial Scholarships.

The third of this year's series of Surprise Butter Inspections, conducted by the Department of Agriculture **Surprise Butter** and Technical Instruction for Ireland, was held **Inspections, 1914**, on 27th May, 1914. The judges were butter merchants of Dublin and Liverpool.

Exhibits were received from one hundred and thirteen creameries. The marks awarded to each exhibit for (1) Flavour, (2) Texture, (3) Colour, (4) Packing and Finish, as well as the percentage of water contained in the butter, are given in the Schedule of Results issued by the Department.

The names of the following creameries are mentioned in the Schedule as having obtained the highest awards at the inspection :—

<i>Name of Creamery.</i>	<i>Position awarded.</i>
Castlecomer C.C., Ltd., Castlecomer	1
Glenwilliam C.D.S., Ltd., Ballingarry, County Limerick	1
Broadford Dairy Co., Ltd., Broadford, Charleville ..	3

<i>Name of Creamery.</i>	<i>Position awarded.</i>
Mitchelstown Creamery (Newmarket Dairy Co., Ltd.) ..	3
Castlemahon C.A. and D.S., Ltd., Castlemahon ..	5
Greencastle C.A. and D.S., Ltd., Greencastle, Co. Tyrone	5
Scottish C.W.S., Ltd., Enniskillen	5
Springfield C.A. and D.S., Ltd., Enniskillen	5
Killen C.A. and D.S., Ltd., Castlederg	9
Kilteely C.C. Co., Ltd., Pallasgreen	9
Sooeey C.A. and D.S., Ltd., Riverstown	9
Suirvale C.A. and D.S., Ltd., Cahir	9
Effin C.A. and D.S., Ltd., Kilmallock	13
Lisnaskea C.A. and D.S., Ltd.	13
Moneymore C.A. and D.S., Ltd.	13
Newcastle West C.D.S., Ltd.	13
Shandon Dairy Co., Dungarvan	13
Silvermines C.D.S., Ltd., Nenagh	13
Spamount C.A. and D.S., Ltd., Castlederg	19
Springmount C.A. and D.S., Ltd., Clonmel	19
Tipperary C.C.S., Ltd.	19
Tullaroan D. and C. Co., Ltd., Freshford	19
Ballinahinch Farmers' C.C., Ltd., Newport	23
Drumcliffe C.A. and D.S., Ltd., County Sligo	23
Erne C.A. and D.S., Ltd., County Fermanagh	23
Fane Valley C.A. and D.S., Ltd., Castleblayney	23
Hollyford C.A. and D.S., Ltd., Tipperary	23
Inch C.D.S., Ltd., County Wexford	23
Inver C.A. and D.S., Ltd., County Donegal	29
Irvinestown C.A. and D.S., Ltd.	29
Kilcommon Creamery (C.W.S., Ltd.), Thurles	29
Lissarda C.D.S., Ltd., County Cork	29
Milford Dairy Co., Ltd., Charleville	29
Muckalee C.A. and D.S., Ltd., Kilkenny	29
Thurles C.A. and D.S. Ltd.	35

The fourth of this year's series of Inspections was held on 11th June, 1914. The judges were butter merchants of Huddersfield and Paisley.

The names of the following creameries are mentioned in the Schedule as having obtained the highest awards at the Inspection :—

<i>Name of Creamery.</i>	<i>Position awarded.</i>
Moneymore C.A. and D.S., Ltd., County Londonderry ..	1
Belleek C.A. and D.S., Ltd., County Fermanagh ..	2
Castlemahon C.A. and D.S., Ltd., County Limerick ..	2

<i>Name of Creamery.</i>	<i>Position awarded.</i>	
Erne C.A. and D.S., Ltd., County Fermanagh ..	2	
Pomeroy C.A. and D.S., Ltd., County Tyrone ..	2	
Drumbane C.A. and D.S., Ltd., County Tipperary ..	6	
Killyman C.A. and D.S., Ltd., County Tyrone ..	6	
Lisnaskea C.A. and D.S., Ltd.	6	
Sooeey C.A. and D.S., Ltd., County Sligo ..	6	
Springfield C.A. and D.S., Ltd., Enniskillen ..	6	
Kilteely C.C. Co., Ltd., County Limerick ..	11	
Scottish C.W. S., Ltd., Enniskillen ..	11	
Ballinahinch Farmers' C.C., Ltd., County Tipperary ..	18	
Borrisoleigh C.D.S., Ltd., County Tipperary ..	18	
Effin C.A. and D.S., Ltd., Kilmallock ..	18	
Glenwilliam C.A. and D.S., Ltd., County Limerick ..	18	
Toomevara C.A. and D.S., Ltd., Nenagh ..	18	
Abington C.C. Co., Ltd., County Limerick ..	18	
Castlecomer C.C., Ltd., County Kilkenny ..	18	
Clones C.A. and D.S., Ltd., County Monaghan ..	18	
Collooney C.A. and D.S., Ltd., County Sligo ..	18	
Fennor C.A. and D.S., Ltd., County Kilkenny ..	18	
Lagan C.A. and D.S., Ltd., County Donegal ..	18	
Ballintrillick C.A. and D.S., Sligo ..	24	
Ballyclough C.C., Mallow	24	
Doons C.A. and D.S., Ltd., County Tyrone ..	24	
Killeter C.A. and D.S., Ltd., County Tyrone ..	24	
Kiltoghert C.A. and D.S., Ltd., Carrick-on-Shannon ..	24	
Muckalee C.A. and D.S., Ltd., County Kilkenny ..	24	
Newmarket D. Co's C., County Cork ..	24	
Spamount C.A. and D.S., Ltd., County Tyrone ..	24	
Tyholland and Middletown C.A. and D.S. Ltd., County Monaghan	24	

STATISTICAL TABLES.

STATISTICAL

FISHERY STATISTICS—

STATEMENT of the Total QUANTITY and VALUE of the FISH returned compared with the

—	North Coast.				East Coast.			
	1914.		1913.		1914.		1913.	
	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.
	Cwt.	£	Cwt.	£	Cwt.	£	Cwt.	£
Brill,	—	—	—	—	21	83	14	29
Soles,	3	14	—	—	41	245	24	134
Turbot,	3	8	—	—	20	101	15	75
Total Prime Fish, .	6	22	—	—	82	429	53	238
Cod,	13	15	26	20	2,303	2,194	1,077	987
Conger Eel, . . .	—	—	4	2	256	211	542	435
Haddock,	—	—	—	—	36	39	374	346
Hake,	—	—	—	—	177	240	552	704
Herrings,	—	—	80	38	21	7	157	35
Ling,	—	—	—	—	215	131	742	591
Mackerel,	—	—	—	—	—	—	—	—
Plaice,	409	378	362	421	457	598	627	644
Ray or Skate, . .	125	38	42	14	328	220	472	308
Sprats,	—	—	—	—	—	—	—	—
Whiting,	—	—	—	—	949	792	552	442
All other except Shell Fish	210	54	241	80	809	499	613	569
Total,	763	507	755	575	5,633	5,360	5,761	5,299
SHELL FISH :—	No.		No.		No.		No.	
Crabs,	3,048	19	10,380	66	1,850	13	6,658	59
Lobsters,	1,146	29	588	22	2,770	143	2,903	139
	Cwt.		Cwt.		Cwt.		Cwt.	
Mussels,	—	—	—	—	65	13	560	53
	No.		No.		No.		No.	
Oysters,	—	—	—	—	8,883	11	6,048	8
	Cwt.		Cwt.		Cwt.		Cwt.	
Other Shell Fish, .	—	—	64	10	447	101	408	180
Total,	—	48	—	98	—	281	—	439
Total value of Fish landed	—	555	—	673	—	5,641	—	5,738

NOTE.—The above figures are subject

TABLES.

IRELAND.

as landed on the IRISH COASTS during the month of April, 1914, as corresponding period in 1913.

South Coast.				West Coast.				Total.			
1914.		1913.		1914.		1913.		1914.		1913.	
Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Cwt.	£	Cwt.	£	Cwt.	£	Cwt.	£	Cwt.	£	Cwt.	£
1	1	—	—	33	63	22	34	55	147	36	63
17	79	23	96	191	842	249	1,160	252	1,180	296	1,390
—	—	—	—	24	104	26	106	47	213	41	181
18	80	23	96	248	1,009	297	1,300	351	1,540	373	1,634
63	51	4	—	258	122	283	119	2,637	2,382	1,390	1,130
24	11	—	—	41	16	9	4	321	238	555	441
4	4	—	—	150	103	381	187	190	146	755	533
—	—	—	—	21	13	—	—	198	253	552	704
264	134	17	7	—	—	17	8	285	141	271	88
44	43	—	—	47	36	257	130	303	210	999	721
21,454	6,516	3,681	1,468	6,525	2,313	2,718	1,597	27,979	8,829	6,399	3,065
144	123	194	166	132	123	183	176	1,142	1,222	1,366	1,407
18	5	7	3	147	19	262	33	618	282	783	358
—	—	—	—	—	—	—	—	—	—	—	—
—	—	25	5	86	39	83	32	1,035	831	660	479
61	31	79	43	298	139	521	202	1,378	723	1,454	894
22,094	6,998	4,030	1,792	7,953	3,932	5,011	3,788	36,443	16,797	15,557	11,454
No.	—	No.	—	No.	—	No.	—	No.	—	No.	—
72	1	—	—	—	—	—	—	4,970	33	17,038	125
108	7	276	15	3,432	132	1,452	48	7,456	311	5,219	224
Cwt.	—	Cwt.	—	Cwt.	40	Cwt.	110	Cwt.	105	Cwt.	670
—	—	—	—	—	—	—	—	—	—	—	—
No.	—	No.	—	No.	—	No.	—	No.	—	No.	—
7,392	14	—	—	—	—	—	—	16,275	25	6,048	8
Cwts.	—	Cwt.	—	Cwt.	421	Cwt.	854	Cwt.	1,222	Cwt.	1,556
354	51	230	25	—	103	—	153	—	255	—	368
—	73	—	40	—	239	—	212	—	641	—	789
—	7,071	—	1,832	—	4,171	—	4,000	—	17,438	—	12,243

to correction in Annual Returns.

FISHERY STATISTICS—

STATEMENT of the Total QUANTITY and VALUE of the Fish returned
compared with the

	North Coast.				East Coast.			
	1914.		1913.		1914.		1913.	
	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.
	Cwt.	£	Cwt.	£	Cwt.	£	Cwt.	£
Brill,	1	1	2	3	13	56	7	15
Soles,	5	25	9	27	60	264	54	236
Turbot,	2	4	2	4	22	124	20	66
Total Prime Fish, .	8	30	13	34	95	444	81	317
Cod,	170	87	240	83	893	903	1,042	1,001
Conger Eel,	—	—	4	1	304	236	720	510
Haddock,	4	2	—	—	36	48	519	481
Hake,	—	—	—	—	424	612	598	781
Herrings,	16,046	13,653	10,427	7,651	568	392	892	444
Ling,	2	1	—	—	281	193	848	645
Mackerel,	2,111	258	1,252	161	4	1	4	2
Plaice,	319	302	353	309	489	698	440	454
Ray or Skate, . . .	71	24	131	36	340	188	511	329
Sprats,	—	—	—	—	—	—	—	—
Whiting,	—	—	—	—	872	768	1,151	813
All other except Shell Fish	337	96	557	359	529	360	681	580
Total,	19,068	14,453	12,977	8,634	4,835	4,843	7,487	6,357
SHELL FISH:— . . .	No.		No.		No.		No.	
Crabs,	6,648	33	20,580	99	8,260	63	11,387	78
Lobsters,	2,868	95	2,676	110	4,970	238	4,293	196
Mussels,	Cwt.	—	Cwt.	—	Cwt.	153	Cwt.	147
Oysters,	No.	—	No.	—	No.	8	No.	27
Other Shell Fish, .	Cwt.	—	Cwt.	—	Cwt.	—	Cwt.	—
Total,	25	4	240	36	149	56	588	246
Total value of Fish landed	—	132	—	245	—	365	—	547
	—	14,585	—	8,879	—	5,208	—	6,904

NOTE.—The above figures are subject

IRELAND.

as landed on the IRISH COASTS during the month of May, 1914, and the corresponding period in 1913.

South Coast.				West Coast.				Total.			
1914.		1913.		1914.		1913.		1914.		1913.	
Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Cwt.	£	Cwt.	£	Cwt.	£	Cwt.	£	Cwt.	£	Cwt.	£
1	3	2	5	10	20	17	35	25	80	28	58
21	96	32	115	62	236	125	570	148	621	220	948
1	2	1	2	23	96	30	127	48	226	53	199
23	101	35	122	95	352	172	732	221	927	301	1,205
58	30	48	33	9	5	5	2	1,130	1,025	1,335	1,119
39	16	8	4	44	12	—	—	387	264	732	515
10	8	1	1	85	62	76	36	135	120	596	518
—	—	—	—	—	—	—	—	424	612	598	781
2,861	666	960	396	34	19	355	132	19,509	14,730	12,634	8,623
110	64	45	21	1	1	3	2	394	259	896	668
16,324	3,729	13,716	4,114	19,766	5,007	16,714	5,523	38,205	8,995	31,686	9,800
93	127	142	145	165	151	389	385	1,066	1,278	1,324	1,293
74	21	2	1	64	10	116	15	549	243	760	381
—	—	—	—	—	—	—	—	—	—	—	—
—	—	5	4	81	29	8	4	953	796	1,164	821
105	60	101	48	440	231	321	200	1,411	747	1,660	1,187
19,697	4,822	15,063	4,889	20,784	5,878	18,159	7,031	64,384	29,996	53,686	26,911
No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
2,053	20	850	8	—	—	—	—	16,961	116	32,817	185
3,848	175	1,877	100	14,262	542	11,323	430	25,948	1,050	20,169	836
Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.
—	—	—	—	—	—	—	—	153	8	147	27
No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
—	—	—	—	—	—	—	—	—	—	—	—
Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.
236	25	110	11	527	101	435	64	937	186	1,373	357
—	220	—	119	—	643	—	494	—	1,360	—	1,405
—	5,042	—	5,008	—	6,521	—	7,525	—	31,356	—	28,316

to correction in Annual Returns.

FISHERY STATISTICS—

STATEMENT of the Total QUANTITY and VALUE of the FISH returned
compared with the

—	North Coast.				East Coast.			
	1914.		1913.		1914.		1913.	
	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.
	Cwt.	£	Cwt.	£	Cwt.	£	Cwt.	£
Brill,	4	7	2	4	9	39	5	11
Soles,	11	54	7	26	60	274	55	271
Turbot,	1	4	3	6	20	100	17	76
Total Prime Fish, .	16	65	12	36	89	413	77	358
Cod,	22	12	32	20	748	839	663	677
Conger Eel,	—	—	—	—	290	242	446	318
Haddock,	—	—	—	—	88	106	404	368
Hake,	—	—	—	—	716	915	491	605
Herrings,	4,908	4,195	1,102	833	15,306	4,472	24,465	7,086
Ling,	—	—	—	—	203	134	600	453
Mackerel,	207	23	68	12	1,233	135	1,311	225
Plaice,	372	332	275	244	355	435	354	368
Ray or Skate, . . .	20	8	12	8	278	159	410	277
Sprats,	—	—	—	—	—	—	—	—
Whiting,	—	—	—	—	500	454	433	382
All other except Shell Fish	256	66	294	122	804	508	598	471
Total,	5,801	4,701	1,795	1,275	20,610	8,812	30,252	11,588
SHELL FISH:— . . .	No.		No.		No.		No.	
Crabs,	10,608	42	13,464	67	25,066	62	14,404	104
Lobsters,	8,568	246	5,340	190	9,535	344	6,824	312
Mussels,	Cwt.	—	Cwt.	—	Cwt.	—	Cwt.	—
Oysters,	No.	—	No.	—	No.	—	No.	—
Other Shell Fish, .	Cwt.	—	Cwt.	—	Cwt.	—	Cwt.	—
Total,	50	8	62	9	175	56	681	236
Total value of Fish landed	—	296	—	266	—	462	—	652
Total value of Fish landed	—	4,997	—	1,541	—	9,274	—	12,240

NOTE.—The above figures are subject

IRELAND.

as Landed on the Irish Coasts during the month of June, 1914, as corresponding period in 1913.

South Coast.				West Coast.				Total.			
1914.		1913.		1914.		1913.		1914.		1913.	
Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Cwt.	£	Cwt.	£	Cwt.	£	Cwt.	£	Cwt.	£	Cwt.	£
1	2	3	6	10	24	13	30	24	72	23	51
15	75	24	97	56	208	95	387	142	611	181	781
—	—	1	2	20	76	29	131	41	180	50	215
16	77	28	105	86	308	137	548	207	863	254	1,047
90	57	107	77	38	16	4	2	898	924	806	776
134	37	40	13	66	22	3	1	490	301	489	332
20	17	6	8	50	27	20	10	158	160	430	386
—	—	—	—	—	—	—	—	716	915	491	605
1,940	831	3,775	1,074	1,192	553	802	334	23,346	10,051	30,144	9,327
175	96	130	76	25	16	—	—	403	246	730	529
10,597	2,578	7,626	1,718	14,601	4,945	13,324	3,898	26,638	7,681	22,329	5,853
85	134	124	165	188	180	343	267	1,000	1,081	1,096	1,044
72	16	13	3	54	13	3	1	424	196	438	289
—	—	—	—	—	—	—	—	—	—	—	—
12	7	12	8	72	28	88	27	584	489	533	417
255	142	210	96	501	242	644	338	1,816	958	1,746	1,027
13,396	3,992	12,071	3,343	16,873	6,350	15,368	5,426	56,680	23,855	59,486	21,632
No.	—	No.	—	No.	—	No.	—	No.	—	No.	—
8,230	82	3,092	28	72	1	657	3	43,978	187	31,617	202
43,734	1,703	19,393	772	50,655	1,802	39,727	1,574	112,492	4,095	71,282	2,848
Cwt.	—	Cwt.	—	Cwt.	—	Cwt.	—	Cwt.	—	Cwt.	—
—	—	—	—	—	—	—	—	—	—	—	—
No.	—	No.	—	No.	—	No.	—	No.	—	No.	—
—	—	—	—	—	—	—	—	—	—	—	—
Cwt.	—	Cwt.	—	Cwt.	—	Cwt.	—	Cwt.	—	Cwt.	—
160	16	170	16	335	62	268	51	720	142	1,181	312
—	1,801	—	816	—	1,865	—	1,628	—	4,424	—	3,362
—	5,793	—	4,159	—	8,215	—	7,054	—	28,279	—	24,994

to correction in Annual Returns.

STATEMENT of the TOTAL QUANTITY of FISH landed on the ENGLISH and WELSH COASTS during the Month and Six Months ended 30th June, 1914, compared with the corresponding periods of the Year 1913.

	June.		Six months ended 30th June.	
	1914.	1913.	1914.	1913.
QUANTITY.				
	Cwt.	Cwt.	Cwt.	Cwt.
Brill,	1,697	1,639	11,061	9,157
Soles,	5,465	4,801	36,998	33,443
Turbot,	6,874	5,934	39,309	31,980
Prime Fish not separately distinguished,	278	347	487	393
Total Prime Fish,	14,314	12,721	87,855	74,973
Bream,	7,594	8,070	34,353	34,606
Catfish,	17,583	14,894	54,613	57,843
Coalfish,	41,161	29,898	255,762	190,954
Cod,	354,753	257,021	1,771,637	1,584,223
Conger Eels,	4,327	3,857	31,508	27,207
Dabs,	7,231	8,222	57,239	51,826
Dogfish,	2,148	1,487	20,745	25,345
Dory,	402	261	1,138	1,006
Flounders or Flukes,	569	347	4,770	3,217
Gurnards,	9,992	11,317	56,388	48,987
Haddock,	146,824	145,694	631,033	747,073
Hake,	87,487	87,204	305,470	303,898
Halibut,	10,124	12,188	44,171	57,750
Latchets (Tubs),	220	49	1,783	1,196
Lemon Soles,	6,211	6,885	25,003	27,124
Ling,	18,188	19,549	114,104	118,583
Megrims,	8,752	5,829	37,603	34,440
Monks (or Anglers),	3,017	2,539	17,810	19,458
Mullet (Red),	11	2	66	183
Plaice,	68,365	56,634	350,686	313,115
Pollack,	1,014	661	8,688	8,840
Skates and Rays,	33,834	29,656	194,178	181,997
Torsk,	4,027	2,217	11,901	10,546
Whiting,	28,766	30,981	239,337	197,369
Witches,	1,893	1,768	19,035	22,136
Herrings,	94,677	132,932	184,233	188,598
Mackerel,	44,600	34,360	212,835	171,323
Mullet (Grey)	48	37	335	401
Pilchards,	425	313	1,172	371
Sprats,	—	—	49,115	19,426
Whitebait,	669	663	2,508	3,912
Fish not separately distinguished,	32,814	30,373	223,899	179,409
Total,	1,052,040	948,629	5,050,973	4,707,335
Shell Fish :—	No.	No.	No.	No.
Crabs,	624,390	813,110	3,568,047	4,090,475
Lobsters,	83,131	91,573	345,895	341,525
Oysters,	1,118,850	400,235	12,650,127	12,120,801
Other Shell Fish,	Cwt.	Cwt.	Cwt.	Cwt.
	30,055	31,384	281,912	250,758

NOTE.—The figures for 1914 are subject to correction.

STATEMENT of the TOTAL VALUE of FISH landed on the ENGLISH and WELSH COASTS during the Month and Six Months ended 30th June, 1914, compared with the corresponding periods of the Year 1913.

	June.		Six months ended 30th June.	
	1914.	1913.	1914.	1913.
VALUE.				
	£	£	£	£
Brill,	5,214	5,122	36,051	32,980
Soles,	37,488	34,598	233,649	230,092
Turbot,	23,263	20,141	156,893	141,073
Prime Fish not separately distinguished,	445	569	787	644
Total Prime Fish,	66,390	60,430	427,380	404,789
Bream,	2,743	1,918	16,046	13,486
Catfish,	6,581	6,171	28,953	24,958
Coalfish,	8,922	7,723	73,237	61,029
Cod,	146,915	121,917	1,035,304	949,868
Conger Eels,	2,771	2,648	22,021	19,966
Dabs,	6,070	6,533	58,867	53,080
Dogfish,	670	536	6,853	9,632
Dory,	309	241	1,085	1,060
Flounders or Flukes,	415	332	3,307	2,190
Gurnards,	2,970	3,022	19,573	16,600
Haddock,	96,624	104,610	573,861	676,070
Hake,	80,577	80,900	325,470	312,195
Halibut,	29,137	33,025	145,616	185,269
Latchets (Tubs),	112	28	994	660
Lemon Soles,	14,048	16,704	72,524	75,511
Ling,	8,513	8,978	59,246	59,477
Megrims,	6,663	5,067	33,824	31,613
Monks (or Anglers),	1,569	1,244	11,575	11,482
Mullet (Red)	53	15	196	603
Plaice,	85,832	78,873	484,187	459,181
Pollack,	528	367	6,297	6,117
Skates and Rays,	24,310	19,140	151,795	131,943
Torsk,	1,387	708	5,294	5,243
Whiting,	14,823	18,178	169,714	146,823
Witches,	1,927	2,204	23,932	29,752
Herrings,	31,019	35,244	63,473	52,445
Mackerel,	23,769	20,573	112,120	99,467
Mullet (Grey),	114	102	710	902
Pilchards,	148	98	445	119
Sprats,	—	—	9,862	4,397
Whitebait	1,442	1,463	5,428	8,877
Fish not separately distinguished,	19,496	19,808	130,127	107,385
Total,	686,847	658,800	4,075,316	3,962,189
Shell Fish:—				
Crabs,	9,399	10,311	39,191	40,691
Lobsters,	3,998	4,499	17,893	16,738
Oysters,	1,423	571	38,983	38,012
Other Shell Fish,	9,762	10,757	62,074	59,405
Total,	24,582	26,138	158,141	154,846
Total value of all Fish,	711,429	684,938	4,233,457	4,117,035

NOTE.—The figures for 1914 are subject to correction.

STATEMENT of the TOTAL QUANTITY of the FISH landed on the SCOTTISH COASTS during the Month and Six Months ended 30th June, 1914, compared with the corresponding periods of the year 1913.

	June		Six Months ended 30th June.	
	1914.	1913.	1914.	1913.
	Quantity			
	Cwt.	Cwt.	Cwt.	Cwt.
Herrings	1,694,853	1,018,043	3,101,389	2,071,628
Sprats	—	—	4,741	2,088
Sparlings	—	—	117	68
Mackerel	5,500	5,418	18,475	11,976
Cod	70,783	64,561	451,562	569,929
Codling	23,817	23,233	112,083	97,367
Ling	2,384	2,138	9,841	7,553
Torsk (Tusk)	28,776	36,618	160,910	176,700
Saith (Coal Fish)				
Haddocks, Extra Large				
Do. Large	40,452	36,297	258,251	340,549
Do. Medium				
Do. Small				
Whittings	16,375	8,662	127,523	85,676
Conger Eels	537	431	19,404	18,249
Gurnards	316	189	2,127	1,309
Catfish	5,224	2,730	19,492	15,619
Monks (Anglers)	1,765	1,333	12,305	9,548
Hake	5,938	1,100	12,074	4,770
Squids	—	—	10	9
Turbot	318	152	2,106	1,563
Halibut	5,185	6,561	22,318	22,579
Lemon Soles	3,766	3,557	14,001	14,916
Flounders	836	403	3,165	4,165
Plaice, Large				
Do. Medium	3,246	1,996	20,153	20,517
Do. Small				
Brill	43	12	217	83
Dabs	762	295	4,245	3,933
Witches	1,704	2,018	10,803	12,077
Megrim	1,041	616	10,373	8,660
Skates and Rays	13,364	11,206	98,699	74,461
Unclassified kinds	833	157	5,149	6,599
Total	1,927,318	1,227,726	4,501,913	3,582,591
	No.	No.	No.	No.
Shell Fish :—				
Crabs	133,590	301,143	1,071,650	1,440,559
Lobsters	39,174	58,438	255,083	258,074
Oysters	12,900	16,300	433,740	715,260
	Cwt.	Cwt.	Cwt.	Cwt.
Clams	25,595	—	28,367	6,673
Mussels	28,780	3,566	63,128	35,690
Unclassified	2,851	2,665	22,647	24,232

NOTE.—The above figures are subject to correction in the Annual Returns.

Statement of the TOTAL VALUE of the FISH landed on the SCOTTISH COASTS during the Month and Six Months ended 30th June, 1914, compared with the corresponding periods of the year 1913.

	June.		Six Months ended 30th June.	
	1914.	1913.	1914.	1913.
	Value			
	£	£	£	£
Herrings	503,671	468,926	827,200	785,037
Sprats	—	—	509	310
Sparlings	—	—	393	222
Mackerel	801	839	5,048	2,659
Cod	33,283	29,220	255,021	265,923
Codling	8,618	8,068	42,840	36,168
Ling	736	605	3,409	2,502
Torsk (Tusk)	3,627	4,306	30,864	24,682
Saith (Coal Fish)				
Haddocks, Extra Large				
Do. Large	29,600	28,016	229,464	264,181
Do. Medium				
Do. Small				
Whittings	6,732	3,712	77,685	43,649
Conger Eels	312	195	8,830	8,093
Gurnards	53	44	429	244
Catfish	1,105	554	5,799	3,932
Monks (Anglers)	337	248	3,632	3,113
Hake	3,180	457	9,571	3,832
Squids	—	—	1	—
Turbot	868	392	6,277	5,365
Halibut	11,436	12,841	53,998	51,024
Lemon Soles	7,450	6,324	37,089	35,232
Flounders	537	213	2,458	2,711
Plaice, Large				
Do. Medium	5,428	3,504	34,892	32,321
Do. Small				
Brill	75	14	362	172
Dabs	340	150	1,859	1,545
Witches	1,417	1,526	13,478	13,428
Megrims	1,393	824	14,204	11,144
Skates and Rays	3,136	2,374	29,982	21,769
Unclassified kinds	67	29	700	816
Total	624,302	573,381	1,696,004	1,620,074
Shell Fish :—				
Crabs	933	2,129	9,038	9,350
Lobsters	1,904	3,409	15,566	14,813
Oysters	50	58	1,623	2,537
Clams	220	—	729	860
Mussels	1,728	199	3,589	2,031
Unclassified	1,239	964	7,108	6,415
Total Value	6,074	6,759	37,653	36,006
Total Value of all Fish	630,376	580,140	1,733,657	1,656,080

NOTE.—The above figures are subject to correction in the Annual Returns.

**STATEMENT of the TOTAL QUANTITY and VALUE of the FISH
returned as landed on the IRISH COASTS during the Month and
Six Months ended 30th June, 1914, compared with the
corresponding periods of the Year 1913.**

	June.		Six Months ended 30th June.	
	1914.	1913.	1914.	1913.
QUANTITY.				
	Owt.	Owt.	Owt.	Owt.
Brill,	24	23	228	276
Soles,	142	181	876	1,131
Turbot,	41	60	268	290
Total Prime Fish,	207	264	1,372	1,697
Cod,	898	806	14,067	15,735
Conger Eel,	490	489	2,578	3,625
Haddock,	158	430	2,384	8,446
Hake,	716	491	2,304	3,571
Herrings,	23,346	30,144	146,949	197,345
Ling,	403	730	2,371	5,388
Mackerel,	26,638	22,329	125,611	64,897
Plaice,	1,000	1,096	5,142	5,597
Ray or Skate,	424	438	2,635	4,675
Sprats,	—	—	77	16
Whiting,	584	533	4,902	4,974
Fish not separately distinguished, except Shell Fish,	1,816	1,746	6,810	8,789
Total,	56,680	59,486	318,102	324,755
Shell Fish :—	No.	No.	No.	No.
Crabs,	43,976	31,617	68,139	84,916
Lobsters,	112,492	71,282	153,493	107,578
Oysters,	—	—	147,309	76,570
Mussels,	Owt.	Owt.	Owt.	Owt.
Other Shell Fish,	720	1,181	4,811	6,000
			5,996	10,607
VALUE.				
	£	£	£	£
Brill,	72	51	598	635
Soles,	611	781	3,881	5,235
Turbot,	180	215	1,267	1,322
Total Prime Fish,	863	1,047	5,736	7,242
Cod,	994	776	10,971	12,050
Conger Eel,	301	339	1,838	2,745
Haddock,	169	386	2,020	5,305
Hake,	915	605	2,825	4,490
Herrings,	10,051	9,327	48,884	71,158
Ling,	246	529	1,844	4,080
Mackerel,	7,681	6,853	34,712	20,661
Plaice,	1,081	1,044	5,916	5,690
Ray or Skate,	196	289	1,701	2,180
Sprats,	—	—	16	4
Whiting,	469	417	3,738	3,598
Fish not separately distinguished, except Shell Fish,	963	1,027	3,738	5,735
Total,	23,265	21,632	123,939	145,008
Shell Fish :—	187	202	344	519
Crabs,	4,065	2,848	5,891	4,383
Lobsters,	—	—	239	145
Oysters,	—	—	652	945
Mussels,	143	319	1,571	2,148
Other Shell Fish,				
Total,	4,424	3,369	8,607	8,140
Total Value of Fish landed,	28,279	24,994	132,626	153,148

NOTE.—The above figures are subject to correction in the Annual Returns.

QUARTERLY AVERAGE PRICES OF CROPS, LIVE STOCK, MEAT, PROVISIONS, &c.,
for the QUARTER ended 30th June, 1914

PRODUCT.	PROVINCE.				IRELAND.	
	Leinster.	Munster.	Ulster.	Con-naught.	1914.	1913.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
CROPS :—						
Wheat. . . per 112 lbs.	—	—	—	—	—	—
Oats (White) . . .	7 3	7 2	7 1½	7 8½	7 3	7 2½
(Black) . . .	6 4½	6 3½	—	—	6 4	7 9½
Barley.	—	—	—	—	—	—
Potatoes	3 2½	4 1½	2 3½	3 9½	3 3	4 5½
Hay (Clover) . . .	3 9½	2 11½	2 11½	2 11½	3 1½	3 10½
(Meadow) . . .	2 8	1 11½	1 11½	2 1½	2 2½	2 7½
Grass Seed—						
(Perennial Rye) . .	—	—	—	—	—	—
(Italian Rye) . .	—	—	—	—	—	—
Flax . . . per 14 lbs.	—	—	—	—	—	—
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
LIVE STOCK :—						
Calves (young) per head	2 14 0	1 15 0	1 18 0	3 7 0	2 11 9	2 8 9
Store Cattle—						
Over 6 and not exceeding						
12 months per head	5 16 0	6 2 0	5 12 3	6 0 0	5 16 9	5 16 3
One year old and under two						
years per head	9 2 6	8 6 6	8 4 3	9 1 0	8 13 6	8 14 0
Two years old and under						
three years per head	12 0 9	10 17 6	10 15 3	11 12 0	11 9 0	11 10 2
Three years old and over ..	14 4 6	12 9 9	—	13 14 9	13 12 3	13 6 1
Fat Cattle—						
Two years old and under						
three years per head	14 6 9	13 9 6	14 11 3	15 11 9	14 8 3	15 5 9
Three years old and over ..	16 17 3	15 7 9	16 6 9	19 5 6	16 14 9	17 13 3
Cows and Bulls per head	14 7 6	12 17 0	13 17 3	14 17 3	13 9 0	13 14 8
Springers—						
Cows and Heifers per head	14 9 0	13 12 6	14 14 3	15 6 0	14 10 9	14 9 0
Milch Cows (down calved) ..	13 4 6	12 18 0	13 6 6	13 0 9	13 3 9	13 9 6
Lambs (under 12 months old)						
per head	1 6 9	1 5 6	1 10 0	1 4 9	1 6 6	1 6 6
Store Sheep—						
One year old and under two						
years per head	1 17 6	2 0 0	1 1 9	1 18 9	1 19 0	1 17 11
Two years old and over ..	1 15 6	1 12 3	1 1 9	2 8 0	1 16 9	1 13 3
Fat Sheep—						
One year old and under two						
years per head	2 2 6	2 10 3	2 4 9	2 5 9	2 5 9	2 6 8
Two years old and over ..	2 6 9	2 12 3	2 5 9	3 2 0	2 11 0	2 11 2
Young Pigs—						
8 to 10 weeks old ..	1 1 3	1 7 9	1 12 9	1 11 6	1 9 3	1 9 3
Store Pigs—						
10 weeks to 4 months old ..	1 11 6	1 8 3	—	—	1 11 0	1 15 11
4 months old and over ..	2 3 0	2 0 0	—	—	2 0 6	2 5 1
Fat Pigs	4 4 3	3 19 6	—	5 15 0	4 7 3	4 17 4
Sows	7 6 0	6 0 0	6 9 6	7 16 0	6 12 0	7 1 11
MEAT, PROVISIONS, &c.						
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Beef (Live) . . per 112 lbs.	—	—	—	—	35 8	39 2
(Dead)	—	—	—	—	62 0	68 6
Mutton (Live) . .	—	—	—	—	41 0	44 1
(Dead)	—	—	—	—	71 9	77 2
Pork (Dead) . . .	52 5	57 11	56 3	57 3	57 8	68 3
Butter (Creamery) .	106 4	103 0	—	—	103 4	106 1
(Factory)	93 1	93 8	—	—	93 8	96 2
(Farmers') . . .	89 3	92 10	92 11	91 11	92 8	92 2
Eggs . . . per 130	8 4	7 10	—	7 4½	7 11½	7 8
Wool . . . per lb.	0 11½	1 0½	—	1 0½	1 0	1 0½

WEEKLY AVERAGE PRICES of WHEAT, OATS, and BARLEY, per 112 lbs.
computed from Market Returns of certain quantities of these Cereals
supplied by Officers of Customs and Excise, during the QUARTER
ended 30th June, 1914.

Returns received in the Week ended	WHEAT.		OATS.		BARLEY.	
	Average Price per 112 lbs.	Quantity.	Average Price per 112 lbs.	Quantity.	Average Price per 112 lbs.	Quantity.
1914.	s. d.	Cwts. of 112 lbs.	s. d.	Cwts. of 112 lbs.	s. d.	Cwts. of 112 lbs.
April 4	—	—	6 6½	3,101	—	—
" 11	—	—	6 9½	2,756	—	—
" 18	—	—	6 9	2,537	—	—
" 25	—	—	6 9	2,484	—	—
May 2	—	—	6 10½	2,281	—	—
" 9	—	—	6 11½	1,858	—	—
" 16	—	—	7 0½	1,739	—	—
" 23	—	—	7 0½	2,594	—	—
" 30	—	—	6 10	1,775	—	—
June 6	—	—	7 4½	1,745	—	—
" 13	—	—	7 2	2,600	—	—
" 20	—	—	7 3½	1,504	—	—
" 27	—	—	7 5	1,608	—	—

QUARTERLY AVERAGE PRICES of FAT CATTLE and FAT SHEEP, per 112 lbs., LIVE
WEIGHT, sold in DUBLIN MARKETS during the period ended 30th
JUNE, 1914, and also for the corresponding period during seventeen
preceding years.

Year.	Fat Cattle.	Fat Sheep.	Year.
	£ s. d.	£ s. d.	
1914.	1 15 6	2 1 0	1914.
1913.	1 19 2	2 4 1	1913.
1912.	1 19 1	1 19 5	1912.
1911.	1 15 5	1 16 8	1911.
1910.	1 18 3	2 1 10	1910.
1909.	1 14 9	1 14 4	1909.
1908.	1 14 10	2 2 3	1908.
1907.	1 14 0	2 2 8	1907.
1906.	1 12 6	2 2 10	1906.
1905.	1 12 9	1 19 10	1905.
1904.	1 14 4	2 0 7	1904.
1903.	1 14 5	2 0 4	1903.
1902.	1 17 4	1 17 0	1902.
1901.	1 13 4	1 18 0	1901.
1900.	1 14 11	2 0 1	1900.
1899.	1 13 7	1 16 4	1899.
1898.	1 10 7	1 14 9	1898.
1897.	1 13 3	1 17 11	1897.

NUMBER of ANIMALS included in Returns furnished under the MARKETS and FAIRS (Weighing of Cattle) ACT, 1891, Sections 3 and 4,
during the Quarter ended 30th June, 1914.

WEEK ENDED	FAT CATTLE.					FAT SHEEP.			
	Dublin.		Belfast.		Total of Cattle included in Returns.	Dublin.		Belfast.	Total Number of Sheep included in Returns.
	Corporation Market Authorities.	Mr. Gavin Low, Auctioneer.	Corporation Market Authorities.	Mr. John Robson, Auctioneer.		Corporation Market Authorities.	Mr. Gavin Low, Auctioneer.		
1914.									
April 2 .	—*	—*	67	48	115	—*	—*	—	—
" 9 .	—*	—*	66	33	99	—*	—*	—	—
" 16 .	—*	—*	71	80	151	—	—	—	134
" 23 .	54	31	70	37	212	—	134	—	263
" 30 .	128	158	70	42	398	—	263	—	136
May 7 .	70	126	68	59	323	—	136	—	379
" 14 .	78	201	58	67	404	—	379	—	141
" 21 .	68	160	66	44	338	—	141	—	387
" 28 .	45	199	65	53	322	—	387	—	296
June 4 .	62	142	71	56	331	—	296	—	202
" 11 .	81	149	70	83	383	—	202	—	202
" 18 .	72	116	71	30	289	—	202	—	228
" 25 .	42	83	67	42	234	—	228	—	—
Totals,	700	1,365	880	634	3,639	—	2,368	—	2,368

* Market closed in consequence of the outbreak of Foot and Mouth Disease.

BUTTER PRICES DURING THE QUARTER

ABSTRACTED FROM "THE GROCER," "GROCER'S REVIEW,"

Excepting 1-lb. Rolls and Farmers' Butter all quotations are the
an Irish Creamery would be 5s. to 7s. per cwt. less than
freight, commission,

COUNTRY OF ORIGIN.	Type of Package.	Place of Sale.	WEEK ENDED			
			APRIL			
			4th.	11th.	18th.	25th.
IRELAND— Creamery Butter,	Kieis, kegs, or pyramid boxes	London,	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.
		Liverpool,	—	104-108	104-107	102-108
		Bristol,	—	—	108-112	108-112
		Cardiff,	108-113	111-113	110-113	105-112
		Manchester,	—	—	—	104-108
		Birmingham,	—	—	—	108-110
		Glasgow,	—	—	—	—
		Limerick,	—	—	—	—
		Cork,	—	—	—	—
		Belfast,	—	—	—	—
	1lb. rolls, in boxes, Salted or Unsalted.	Dublin,	112-121/4	112-116	112	108-112
		F.O.R.,	116/8-126	116/8-126	116/8-121/4	116/8-121/4
	Factories,	London,	—	—	—	—
		Liverpool,	—	98-102	96-100	96-100
		Bristol,	—	—	—	—
Farmers' Butter,	Cardiff,	—	—	—	—	
	Manchester,	—	—	—	—	
	Cork,	120	102-120	97-106	95-99	
	Do. 2nd "	Cork,	98-104	93-100	93-95	90-95
	Do. 3rd "	Cork,	96	94	88-92	88
	Fresh,	Cork,	104-108	98-104	93-98	95-103
FRANCE,	12x2lb. rolls,	London,	Per doz. lbs. 12/6-15/6	Per doz. lbs. 12/6-15/6	Per doz. lbs. 12-15	Per doz. lbs. 12-15
	Paris baskets,	do.,	Per cwt. 120-133	Per cwt. 120-133	Per cwt. 116-129	Per cwt. 116-129
DENMARK AND SWEDEN.	Kieis,	Copenhagen Quotation.	104 Kr. } 116/6 per } 50 } cwt. } (Kilos)	101 Kr. } 113/1 per } 50 } cwt. } (Kilos)	97 Kr. } 108/7 per } 50 } cwt. } (Kilos)	97 Kr. } 108/7 per } 50 } cwt. } (Kilos)
		Average over- price.	—	—	—	—
		London,	122-124	122-124	114-118	114-118
		Liverpool,	118-128	118-124	113-120	108-118
		Bristol,	—	—	—	—
		Cardiff,	120-131	120-131	118-124	116-120
		Manchester,	121-127	114-125	115-120	111-116
		Birmingham,	125-127	123-126	119-122	116-118
		Newcastle-on- Tyne,	120-128	121-122	112-118	112-115
		Glasgow,	125-126	122-123	118-119	113-114
	1lb. rolls, 10x24 lb. boxes.	Leth,	123-124/6	120-123	116-117	112
		Hull,	121-126	120-123	117-118	113-117
		F.O.R. Lon- don	—	—	—	—
FINLAND	Kieis,	Manchester,	117-123	117-123	112-118	108-115
		Liverpool,	116-119	116-117	111-116	106-111
		Hull,	112-120	113-116	110-112	105-107
		Cardiff,	—	—	—	—

ENDED 30TH JUNE, 1914.

"GROCER'S GAZETTE," AND OTHER TRADE REPORTS.

Landed Prices of the Choicest Qualities. The Nett F.O.R. Price to the Landed Prices in Great Britain. This figure covers handling, &c.

WEEK ENDED								
MAY.					JUNE.			
2nd.	9th.	16th.	23rd.	30th.	6th.	13th.	20th.	27th.
Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.
105-109	104-112	108-110	107-112	105-110	104-110	104-110	106-112	108-112
112-114	104-108	106-109	107-110	105-108	102-105	102-108	104-109	106-112
110-114	112-114	112-114	111-114	109-114	108-112	108-112	108-114	110-114
104-108	110-113	111-113	110-113	108-111	107-110	106-112	108-113	111-114
108-110	108-110	110-114	110-114	107-112	107-112	106-112	104-111	106-112
104-106	104-106	110-111	110-112	110-111	108-110	108-110	109-110	110-111
—	—	—	108-110	108-109	106-108	106-108	108-110	108-110
—	—	—	—	—	—	—	—	—
108-112	108-112	108-112	107-112	106-110	107/4	105-107/4	105-107/4	107/4-109/8
116/8-121/4	112-116/8	112-116/8	112-116/8	112-116/8	112-116/8	112-116/8	112-116/8	112-121/4
—	—	97-104	97-104	96-104	94-104	94-104	96-104	96-104
95-98	94-97	95-98	95-98	95-98	92-98	94-98	96-100	96-102
98-102	98-104	98-104	98-104	96-104	96-104	100-104	96-104	96-104
98-104	100-104	94-98	90-98	94-102	100-102	100	98-104	98-102
98-104	98-104	96-100	92-96	90-93	90-92	92-93	93-95	94-95
90-92	88-91	91-93	91-92	89-90	88-90	89-91	91-93	91-93
88	87-88	87	88-90	—	—	87	—	—
100-105	98-102	99-101	93-98	93	93	93-95	95	95-98
Per doz. lbs. 11/6-14/8	Per doz. lbs. 11-14	Per doz. lbs. 11-14	Per doz. lbs. 10/8-13/6	Per doz. lbs. 10/6-13/6	Per doz. lbs. 10/6-13/6	Per doz. lbs. 10/6-13/6	Per doz. lbs. 10/6-13/6	Per doz. lbs. 10/6-13
Per cwt. 114-127	Per cwt. 110-123	Per cwt. 110-123	Per cwt. 106-118	Per cwt. 106-118	Per cwt. 106-118	Per cwt. 106-118	Per cwt. 106-118	Per cwt. 104-114
94 Kr. } 105/2 per } -per 50 cwt.	95 Kr. } 106/3 per } -per 50 cwt.	96 Kr. } 107/4 per } -per 50 cwt.	98 Kr. } 107/4 per } -per 50 cwt.	96 Kr. } 107/4 per } -per 50 cwt.	97 Kr. } 108/7 per } -per 50 cwt.	97 Kr. } 108/7 per } -per 50 cwt.	98 Kr. } 109/4 per } -per 50 cwt.	99 Kr. } 110/7 per } -per 50 cwt.
Kilos	Kilos	Kilos	Kilos	Kilos	Kilos	Kilos	Kilos	Kilos
111-113	112-114	113-115	113-115	113-116	114-116	114-116	115-117	116-118
108-116	107-115	108-116	110-118	110-118	110-117	110-117/6	112-118	113-119
116-120	110-118	112-120	116-121	112-121	112-120	112-121	116-121	114-123
109-115	111-115	112-118	112-118	112-118	112-118	113-119	113-119	115-120
115-117	113-115	115-117	115-118	115-118	116-118	117-119	117-119	118-120
111-114	110-114	112-118	114-117	115-117	115-117	116-118	116-119	117-119
113-114	110-111	112-113	114-115	114-115	113-114	114-115	115-116	116-117
112-113	109-112	113	116	115/6-116	114-114/6	115	116	117/6-118
112-118	110-114	110-115	112-118	113-114	111-116	112-116	113-117.	114-118
—	—	—	—	—	—	—	—	—
108-114	106-111	108-114	108-114	106-114	106-114	108-114	110-114	111-116
105-111	104-108	104-109	106-110	108-110	106-110	104-109	109-114	112-118
105-112	103-105	102-104	104-106	103-105	103-104	103-105	104-106	103-110
—	—	—	—	—	—	—	—	—

[Continued on pages 790 and 791.

BUTTER PRICES DURING THE QUARTER
ABSTRACTED FROM "THE GROCER," "GROCER'S REVIEW,"

Excepting 1-lb. Rolls and Farmers' Butter all quotations are the
 an Irish Creamery would be 5s. to 7s. per cwt. less than
 freight, commission,

COUNTRY OF ORIGIN	Type of Package.	Place of Sale.	WEEK ENDED.			
			APRIL			
			4th.	11th.	18th.	25th.
RUSSIA AND SIBERIA,	Kieis,	London,	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.	Per cwt. s. s.
		Liverpool,	106-108	102-106	100-104	99-102
		Bristol,	104-110	96-108	96-108	96-106
		Cardiff,	110-112	110-112	104-108	102-108
		Manchester,	104-111	104-109	100-108	106-108
		Birmingham,	107-112	105-110	100-105	98-103
		Glasgow,	112-114	108-112	104-108	102-106
		Leith,	110-112	108-110	106-108	106-108
		Hull,	108-112	106-109	102-105	100-104
			—	—	—	—
HOLLAND,	Boxes,	London,	—	—	—	—
	Rolls,	do.,	13/6-14	13/6-14	13-13/6	13-13/6
	Boxes,	Glasgow,—	—	—	—	—
	Fresh,	—	—	—	—	
	Salt,	—	—	—	—	
ITALY,		Manchester,	—	—	—	—
		Hull,	120-122	120-124	116-124	114-119
CANADA,	Rolls,	London,	Per doz. lbs.	Per doz. lbs.	Per doz. lbs.	Per doz. lbs.
			—	—	—	—
AUSTRALIA AND NEW ZEALAND,*	56 lb. boxes,	London,	Per cwt.	Per cwt.	Per cwt.	Per cwt.
		Liverpool,	—	—	—	—
		Bristol,	—	—	—	—
		Cardiff,	—	—	—	—
		Birmingham,	—	—	—	—
		Manchester,	—	—	—	—
		Glasgow,	—	—	—	—
	Boxes,	London,	A.s. 102-106	A.s. 100-106	A.s. 100-106	A.s. 100-106
			u. 104-112	u. 104-110	u. 104-110	u. 104-110
		Liverpool,	Z. 105-118	Z. 104-118	Z. 106-118	Z. 106-118
			A. 104-110	A. 104-106	A. 103-106	A. 102-106
		Bristol,	Z. 108-111	Z. 107-110	Z. 107-110	Z. 107-110
			A. 106-110	A. 106-116	A. 104-116	A. 104-116
		Cardiff,	Z. 108-121	Z. 108-121	Z. 110-121	Z. 110-121
			A. 110-112	A. 104-110	A. 104-108	A. 106-110
		Manchester,	Z. 110-114	Z. 109-112	Z. 110-112	Z. 111-112
			A. 108-112	A. 106-109	A. 105-108	A. 103-106
Birmingham,		Z. 112-116	Z. 110-112	Z. 109-112	Z. 108-112	
		A. 106-112	A. 104-110	A. 106-108	A. —	
Glasgow,		Z. 113-115	Z. 110-113	Z. 110-112	Z. 110-112	
		A. 110-112	A. 108-110	A. 108-110	A. 108-110	
Leith,		Z. 112-114	Z. 111-113	Z. 110-113	Z. 110-111	
		A. —	A. —	A. —	A. —	
Hull,		Z. —	Z. —	Z. —	Z. —	
		A. 106-112	A. 106-110	A. —	A. 104-108	
		Z. 110-116	Z. 110-112	Z. 110-112	Z. 108-110	
ARGENTINA,		Boxes,	London,	100-108	100-108	96-108	98-108
	Liverpool,		106-110	105-107	104-106	102-105
	Bristol,		—	—	—	—
	Cardiff,		110	104-108	104-109	—
	Manchester,		112	106-110	105-107	103-105
	Birmingham,		108-112	104-110	—	—
	Glasgow,		106-110	106-110	104-108	104-106
			—	—	—	—
UNITED STATES,	Tubs and boxes,	London,	—	—	—	—
		Liverpool,	—	—	—	—
		Bristol,	—	—	—	—
		Cardiff,	—	—	—	—
		Manchester,	—	—	—	—

* A.—Australia.

Z.—New Zealand.

s.—salted.

u.—unsalted

ENDED 30TH JUNE, 1914—Continued.

"GROCER'S GAZETTE," AND OTHER TRADE REPORTS.

Landed Prices of the Choicest Qualities. The Nett F.O.R. Price to the Landed Prices in Great Britain. This figure covers handling, &c.

[illegible]

TABLES SHOWING THE EXPORTS

TABLE

RETURN of the NUMBER of ANIMALS EXPORTED from IRELAND to GREAT
the PORTS of EMBARKATION

IRISH PORTS.	CATTLE.							SHEEP.			
	Fat.	Stores (fatten- ing).	Milch Cows.	Spring- ers.	Other Cattle.	Calves.	Total.	Fat.	Stores.	Lambs.	Total.
Ballina, . . .	84	37	—	—	120	—	241	—	—	37	37
Belfast, . . .	8,244	33,329	927	2,043	21	49	44,613	154	—	3,287	3,441
Colerain, . . .	44	902	—	—	—	—	946	—	—	—	—
Cork, . . .	—	—	—	—	—	—	—	—	—	—	—
Drogheda, . . .	1,705	48	251	36	—	—	2,040	2,139	—	14,036	16,175
Dublin, . . .	32,211	9,631	1,119	96	—	—	43,057	19,896	—	80,439	80,335
Dundalk, . . .	6,860	2,733	194	118	—	—	9,905	878	35	9,744	10,657
Dundrum, . . .	—	—	—	—	—	—	—	—	—	—	—
Greenore, . . .	—	4,092	104	67	—	—	4,263	2	85	15	102
Larne, . . .	10	9,390	34	118	—	10	9,562	36	40	11	87
Limerick, . . .	—	—	—	—	—	—	—	—	—	—	—
Londonderry, . . .	8,592	24,501	110	263	6	3,473	38,945	220	946	1,937	3,103
Milford, . . .	—	—	—	—	—	—	—	—	—	—	—
Mulroy, . . .	—	—	—	—	—	—	—	—	—	—	—
Newry, . . .	436	1,641	71	77	—	—	2,125	60	—	1,082	1,142
Portrush, . . .	—	—	—	—	—	—	—	—	—	—	—
Rosslare, . . .	—	—	—	—	—	—	—	—	—	—	—
Sligo, . . .	503	1,116	—	8	—	—	1,027	319	—	577	896
Warrenpoint, . . .	—	—	—	—	—	—	—	—	—	—	—
Waterford, . . .	7,959	1,451	7	8	—	63	9,488	2,578	—	6,711	9,289
Westport, . . .	124	168	—	—	—	—	292	2,644	—	1,543	4,187
Wexford, . . .	—	—	—	—	—	—	—	—	—	—	—
TOTAL, . . .	66,772	88,939	2,817	2,834	147	3,595	165,104	28,926	1,106	99,419	129,451

TABLE

RETURN of the NUMBER of ANIMALS EXPORTED from IRELAND to GREAT
the PORTS of DEBARKATION

BRITISH PORTS.	CATTLE.							SHEEP.			
	Fat.	Stores (fatten- ing).	Milch Cows.	Spring- ers.	Other Cattle.	Calves.	Total.	Fat.	Stores.	Lambs.	Total.
Ardrossan, . . .	—	—	—	—	—	—	—	—	—	—	—
Ayr, . . .	284	17,010	78	318	—	30	17,720	36	40	11	87
Barrow, . . .	168	4,597	17	95	—	—	4,877	—	—	—	—
Bristol, . . .	616	373	—	—	—	—	989	456	—	246	702
Cardiff, . . .	—	—	—	—	—	—	—	—	—	—	—
Dover, . . .	—	—	—	—	—	—	—	—	—	—	—
Falmouth, . . .	—	—	—	—	—	—	—	—	—	—	—
Fishguard, . . .	1,537	854	7	8	—	63	2,409	40	—	553	593
Fleetwood, . . .	555	2,189	401	508	2	—	3,055	—	—	1,727	1,727
Glasgow, . . .	6,333	13,325	385	872	132	3,033	24,080	194	8	1,982	2,184
Greenock, . . .	292	13,930	7	223	1	414	14,867	—	—	448	448
Heysham, . . .	298	11,547	157	350	12	45	12,409	—	847	777	1,624
Holyhead, . . .	3,287	11,157	724	163	—	—	15,311	4,340	85	9,254	13,679
Liverpool, . . .	44,964	5,274	941	241	—	—	51,420	18,111	126	72,844	91,061
London, . . .	—	—	—	—	—	—	—	—	—	—	—
Manchester, . . .	8,203	27	43	—	—	—	8,273	5,671	—	11,577	17,248
Newhaven, . . .	—	—	—	—	—	—	—	—	—	—	—
Plymouth, . . .	—	—	—	—	—	—	—	—	—	—	—
Preston, . . .	—	—	—	—	—	—	—	—	—	—	—
Stilth, . . .	215	2,368	39	—	—	—	2,652	78	—	—	78
Southampton, . . .	—	—	—	—	—	—	—	—	—	—	—
Stranraer, . . .	10	6,288	18	56	—	10	6,382	—	—	—	—
Whitehaven, . . .	—	—	—	—	—	—	—	—	—	—	—
TOTAL, . . .	66,772	88,939	2,817	2,834	147	3,595	165,104	28,926	1,106	99,419	129,451

AND IMPORTS OF ANIMALS.

I.

BRITAIN during the Three Months ended 30TH JUNE, 1914, showing
IN IRELAND.

SWINE.			Goats.	HORSES.				Mules or Jennets	Asses.	Total Animals	IRISH PORTS.
Fat.	Stores.	Total.		Stal- lions.	Mares.	Geld- ings.	Total.				
309	—	309	—	—	—	—	—	—	—	587	Ballina.
171	207	378	1	—	1,125	1,824	2,949	—	56	51,438	Belfast.
9	—	9	—	—	11	11	22	—	2	979	Coleraine.
—	—	—	—	—	73	128	201	—	325	526	Cork.
233	149	382	2	—	19	28	47	—	1	18,647	Drogheda.
4,172	—	4,172	1	40	1,451	1,155	2,646	1	389	130,601	Dublin.
3,994	78	4,072	28	—	213	129	342	—	44	25,048	Dundalk.
—	—	—	—	—	—	—	—	—	—	—	Dundrum.
3	—	3	2	—	2,387	1,355	3,742	—	36	8,148	Greenore.
2	100	102	5	1	50	151	202	—	—	9,958	Larne.
—	—	—	—	—	20	17	37	—	—	37	Limerick.
148	4	152	—	—	104	99	203	1	1	40,405	Londonderry.
—	—	—	—	—	—	—	—	—	—	—	Millford.
32	—	32	—	—	—	—	—	—	—	—	Mulroy.
—	—	—	—	—	3	2	5	—	18	3,322	Newry.
—	—	—	—	—	—	—	—	—	—	—	Portrush.
—	—	—	—	—	—	—	—	—	—	—	Rosslare.
4,287	42	4,329	—	—	—	1	1	—	—	6,853	Sligo.
1,334	—	1,334	1	—	434	468	902	1	337	21,352	Warrenpoint.
714	—	714	—	—	1	—	1	—	—	5,194	Waterford.
—	—	—	—	—	—	—	—	—	—	—	Westport.
—	—	—	—	—	—	—	—	—	—	—	Wexford.
15,408	580	15,988	40	41	5,891	5,368	11,300	3	1,209	323,095	TOTAL.

II.

BRITAIN during the Three Months ended 30TH JUNE, 1914, showing
IN GREAT BRITAIN.

SWINE.			Goats.	HORSES.				Mules or Jennets	Asses.	Total Animals	BRITISH PORTS.
Fat.	Stores.	Total.		Stal- lions.	Mares.	Geld- ings.	Total.				
—	—	—	—	—	200	442	642	—	31	673	Ardrossan.
2	207	209	—	—	90	108	198	—	—	18,214	Ayr.
21	—	21	—	—	72	112	184	—	—	5,082	Barrow.
40	—	40	—	—	36	40	76	—	80	1,887	Bristol.
—	—	—	—	—	—	—	—	—	—	—	Cardiff.
—	—	—	—	—	—	—	—	—	—	—	Dover.
—	—	—	—	—	—	—	—	—	—	—	Falmouth.
296	—	296	—	—	422	476	898	1	452	4,709	Fishguard.
—	—	—	1	—	405	567	972	—	26	6,381	Fleetwood.
2,487	4	2,491	—	4	315	460	779	1	14	29,549	Glasgow.
2	—	2	—	—	3	4	7	—	1	15,325	Greenock.
11	—	11	—	—	315	419	734	—	4	14,782	Heysham.
1,841	—	1,841	2	34	3,443	2,152	5,629	—	206	36,668	Holyhead.
10,681	269	10,950	32	—	423	341	764	1	391	154,639	Liverpool.
—	—	—	—	—	—	—	—	—	—	—	London.
27	—	27	—	—	52	32	84	—	—	25,632	Manchester.
—	—	—	—	—	8	6	14	—	—	14	Newhaven.
—	—	—	—	—	4	17	21	—	—	21	Plymouth.
—	—	—	—	—	28	20	48	—	3	51	Preston.
—	—	—	—	1	14	14	29	—	—	2,759	Shiloh.
—	—	—	—	1	11	7	19	—	1	20	Southampton.
—	100	100	5	1	50	151	202	—	—	6,689	Stranraer.
—	—	—	—	—	—	—	—	—	—	—	Whitehaven.
15,408	580	15,988	40	41	5,891	5,368	11,300	3	1,209	323,095	TOTAL.

TABLE

RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from GREAT
the PORTS OF

IRISH PORTS.	CATTLE.							SHEEP.			
	Fat.	Stores (fatten- ing).	Milch Cows.	Spring- ers.	Other Cattle.	Calves.	Total.	Fat.	Stores.	Lambs.	Total.
Ballina, .	—	—	—	—	—	—	—	—	—	—	—
Belfast, .	—	—	—	—	67	—	67	1,870	17	—	1,887
Coleraine, .	—	—	—	—	—	—	—	—	—	—	—
Cork, .	—	—	—	—	—	—	—	—	—	—	—
Drogheda, .	—	—	—	—	—	—	—	—	—	—	—
Dublin, .	—	8	—	—	—	—	8	—	1	—	1
Dundalk, .	—	—	—	—	—	—	—	—	—	—	—
Dundrum, .	—	—	—	—	—	—	—	—	—	—	—
Greenore, .	—	1	—	—	—	1	1	—	—	—	—
Larne, .	—	9	2	—	—	5	16	—	—	—	—
Limerick, .	—	—	—	—	—	—	—	—	—	—	—
Londonderry, .	—	6	—	—	—	1	7	—	—	—	—
Millford, .	—	—	—	—	—	—	—	—	—	—	—
Mulroy, .	—	—	—	—	—	—	—	—	—	—	—
Newry, .	—	—	—	—	—	—	—	—	—	—	—
Portrush, .	—	—	—	—	—	—	—	—	—	—	—
Rosslare, .	—	—	—	—	—	—	—	—	—	—	—
Silgo, .	—	1	—	—	—	—	1	—	15	—	15
Warrenpoint, .	—	—	—	—	—	—	—	—	—	—	—
Waterford, .	—	7	—	6	—	1	14	—	—	—	—
Westport, .	—	—	—	—	—	—	—	—	—	—	—
Wexford, .	—	—	—	—	—	—	—	—	—	—	—
TOTAL, .	—	32	2	6	67	7	114	1,870	33	—	1,903

TABLE

RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from GREAT
the PORTS of EMBARKATION

BRITISH PORTS.	CATTLE.							SHEEP.			
	Fat.	Stores (fatten- ing).	Milch Cows.	Spring- ers.	Other Cattle.	Calves.	Total.	Fat.	Stores.	Lambs.	Total.
Ardrossan, .	—	—	—	—	50	—	50	1,026	17	—	1,043
Ayr, .	—	—	—	—	—	—	—	810	—	—	810
Barrow, .	—	—	—	—	—	—	—	—	—	—	—
Bristol, .	—	—	—	—	—	—	—	—	—	—	—
Cardiff, .	—	—	—	—	—	—	—	—	—	—	—
Falmouth, .	—	—	—	—	—	—	—	—	—	—	—
Fishguard, .	—	3	—	6	—	1	10	—	—	—	—
Fleetwood, .	—	—	—	—	3	—	3	—	—	—	—
Glasgow, .	—	13	—	—	13	—	26	33	15	—	48
Greenock, .	—	—	—	—	—	—	—	—	—	—	—
Heysham, .	—	—	—	—	—	—	—	—	1	—	1
Holyhead, .	—	4	—	—	—	—	4	—	—	—	—
Liverpool, .	—	—	—	—	—	1	1	1	—	—	1
London, .	—	—	—	—	—	—	—	—	—	—	—
Manchester, .	—	—	—	—	—	—	—	—	—	—	—
Newhaven, .	—	—	—	—	—	—	—	—	—	—	—
Plymouth, .	—	2	—	—	—	—	2	—	—	—	—
Preston, .	—	—	—	—	—	—	—	—	—	—	—
Silloth, .	—	—	—	—	—	—	—	—	—	—	—
Southampton, .	—	1	—	—	1	—	2	—	—	—	—
Stranraer, .	—	9	2	—	—	5	16	—	—	—	—
Whitehaven, .	—	—	—	—	—	—	—	—	—	—	—
TOTAL, .	—	32	2	6	67	7	114	1,870	33	—	1,903

III.

BRITAIN during the Three Months ended 30TH JUNE, 1914, showing
DEBARKATION IN IRELAND.

SWINE.			Goats.	HORSES.				Mules or Jennets	Asses.	Total Animals	IRISH PORTS.
Fat.	Stores.	Total.		Stal- lions.	Mares.	Geld- ings.	Total.				
—	—	—	—	—	—	—	—	—	—	—	Ballina.
—	—	—	2	4	60	38	102	—	—	2,058	Belfast.
—	—	—	—	—	4	—	4	—	—	—	Coleraine.
—	—	—	—	2	23	28	53	—	—	53	Cork.
—	—	—	—	—	2	—	2	—	—	2	Drogheda.
—	—	—	—	175	324	152	651	—	1	661	Dublin.
—	—	—	—	—	3	1	4	—	—	4	Dundalk.
—	—	—	—	—	—	—	—	—	—	—	Dundrum.
—	—	—	3	—	48	14	62	—	—	66	Greenore.
—	—	—	—	6	9	4	19	—	—	35	Larne.
—	—	—	—	—	—	1	1	—	—	1	Limerick.
—	—	—	—	1	3	4	8	—	—	15	Londonderry.
—	—	—	—	—	—	—	—	—	—	—	Millford.
—	—	—	—	—	—	—	—	—	—	—	Mulroy.
—	—	—	—	—	1	—	1	—	—	1	Newry.
—	—	—	—	—	—	—	—	—	—	—	Portrush.
—	—	—	—	—	—	—	—	—	—	—	Rosslare.
—	—	—	—	—	—	—	—	—	—	16	Sligo.
—	—	—	—	—	—	—	—	—	—	—	Warrenpoint.
—	—	—	—	5	23	42	70	—	—	84	Waterford.
—	—	—	—	—	—	—	—	—	—	—	Westport.
—	—	—	—	—	—	—	—	—	—	—	Wexford.
—	—	—	5	193	500	284	977	—	1	3,000	TOTAL.

IV.

BRITAIN during the Three Months ended 30TH JUNE, 1914, showing
IN GREAT BRITAIN.

SWINE.			Goats.	HORSES.				Mules or Jennets	Asses.	Total Animals	BRITISH PORTS.
Fat.	Stores.	Total.		Stal- lions.	Mares.	Geld- ings.	Total.				
—	—	—	—	—	2	2	4	—	—	1,097	Ardrossan.
—	—	—	—	1	8	1	10	—	—	820	Ayr.
—	—	—	—	—	—	—	—	—	—	—	Barrow.
—	—	—	—	—	2	2	4	—	—	4	Bristol.
—	—	—	—	—	—	—	—	—	—	—	Cardiff.
—	—	—	—	—	—	—	—	—	—	—	Falmouth.
—	—	—	—	7	41	56	104	—	—	114	Fishguard.
—	—	—	—	—	31	20	51	—	—	54	Fleetwood.
—	—	—	—	5	21	16	42	—	—	116	Glasgow.
—	—	—	—	—	—	—	—	—	—	—	Greenock.
—	—	—	—	—	6	6	12	—	—	13	Heysham.
—	—	—	3	172	348	147	667	—	1	675	Holyhead.
—	—	—	2	1	23	21	45	—	—	49	Liverpool.
—	—	—	—	—	1	—	1	—	—	1	London.
—	—	—	—	1	—	1	2	—	—	2	Manchester.
—	—	—	—	—	1	1	2	—	—	2	Newhaven.
—	—	—	—	—	2	5	7	—	—	9	Plymouth.
—	—	—	—	—	—	—	—	—	—	—	Preston.
—	—	—	—	—	4	1	5	—	—	5	Silloth.
—	—	—	—	—	1	1	2	—	—	4	Southampton.
—	—	—	—	6	9	4	19	—	—	35	Stranraer.
—	—	—	—	—	—	—	—	—	—	—	Whitehaven
—	—	—	5	193	500	284	977	—	1	3,000	TOTAL.

RETURN of the NUMBER of ANIMALS EXPORTED from IRELAND to the
showing the PORTS of

IRISH PORTS.	CATTLE.					SHEEP.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.
BELFAST, .	—	20	—	—	20	—	—	—
DUBLIN, .	—	—	—	—	—	—	198	198
TOTAL, .	—	20	—	—	20	—	198	198

RETURN of the NUMBER of ANIMALS EXPORTED from IRELAND to the
showing the PORTS of DEBARKATION

ISLE OF MAN PORT.	CATTLE.					SHEEP.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.
DOUGLAS, .	—	20	—	—	20	—	198	198

RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from the
showing the PORTS of

IRISH PORTS.	CATTLE.					SHEEP.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.
BELFAST, .	—	—	—	—	—	—	—	—
DUBLIN, .	—	—	—	—	—	—	—	—
TOTAL, .	—	—	—	—	—	—	—	—

RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from the
showing the PORTS of EMBARKATION

ISLE OF MAN PORT.	CATTLE					SHEEP.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.
DOUGLAS, .	—	—	—	—	—	—	—	—

**ISLE OF MAN during the Three Months ended 30th June, 1914,
EMBARKATION in IRELAND.**

SWINE.			Goats	HORSES.				Mules or Jennets.	Asses.	Total Animals.	IRISH PORTS.
Fat.	Stores.	Total.		Stallions	Mares.	Geldings	Total.				
—	—	—	—	1	24	56	81	—	—	101	BELFAST. DUBLIN.
—	—	—	—	—	26	32	58	—	—	256	
—	—	—	—	1	50	88	139	—	—	357	TOTAL

**ISLE OF MAN during the Three Months ended 30th June, 1914,
in the ISLE OF MAN.**

SWINE.			Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	ISLE OF MAN PORT.
Fat.	Stores.	Total.		Stallions	Mares.	Geldings	Total.				
—	—	—	—	1	50	88	139	—	—	357	DOUGLAS.

**ISLE OF MAN during the Three Months ended 30th June, 1914,
DEBARKATION in IRELAND.**

SWINE.			Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	IRISH PORTS.
Fat.	Stores.	Total.		Stallions	Mares.	Geldings	Total.				
—	—	—	—	—	1	—	1	—	—	1	BELFAST. DUBLIN.
—	—	—	—	—	—	—	—	—	—	—	
—	—	—	—	—	1	—	1	—	—	1	TOTAL.

**ISLE OF MAN during the Three Months ended 30th June, 1914,
in the ISLE OF MAN.**

SWINE.			Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	ISLE OF MAN PORT.
Fat.	Stores.	Total.		Stallions	Mares.	Geldings	Total.				
—	—	—	—	—	1	—	1	—	—	1	DOUGLAS.

COASTING AND

RETURN OF THE NUMBER OF ANIMALS SHIPPED to and from Places in
the Places of Embarkation

IRISH PORTS.	CATTLE.					SHEEP.			SWINE.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.	Fat.	Stores.	Total.
Cork to Aghada Pier, .	—	—	—	—	—	—	—	—	—	—	—
" to Belfast, .	—	—	—	—	—	—	—	—	—	—	—
" to Spike Island, .	—	—	—	—	—	—	—	—	—	—	—
" to Queenstown, .	—	—	—	—	—	—	—	—	—	—	—
" to Waterford, .	—	—	—	—	—	—	—	—	—	—	—
Total, .	—	—	—	—	—	—	—	—	—	—	—
Aghada Pier to Cork, .	—	—	—	—	—	—	—	—	—	—	—
Belfast " .	—	—	2	—	2	—	—	—	—	—	—
Spike Island " .	—	—	—	—	—	—	—	—	—	—	—
Queenstown " .	—	—	—	—	—	—	—	—	—	—	—
Waterford " .	—	—	—	—	—	—	—	—	—	—	—
Total, .	—	—	2	—	2	—	—	—	—	—	—
Waterford to Ballyhack, .	—	15	—	6	21	—	—	—	—	—	—
" to Belfast, .	—	25	—	40	65	—	—	—	—	2	2
" to Duncannon .	—	—	—	—	—	—	—	—	—	—	—
Total, .	—	40	—	46	86	—	—	—	—	2	2
Ballyhack to Waterford, .	107	—	—	—	107	50	—	50	5	—	5
Dublin to Belfast, .	—	—	—	—	—	—	—	—	—	—	—
Duncannon to Waterford, .	104	1	—	—	105	72	46	118	166	—	166
Kilrush to Limerick, .	—	—	—	—	—	—	—	—	174	—	174
Kildysart " .	—	—	—	—	—	—	—	—	—	—	—
Glin, " .	—	—	—	—	—	—	—	—	—	—	—
Portumna, " .	—	—	—	—	—	—	—	—	—	—	—
Tarbert, " .	—	—	—	—	—	—	—	—	—	—	—
Kilkee, " .	—	—	—	—	—	—	—	—	—	—	—
Total, .	—	—	—	—	—	—	—	—	174	—	174
Milford to Portrush, .	—	—	—	—	—	—	—	—	—	—	—
Belfast to Dublin, .	—	—	—	47	47	—	—	—	—	—	—
Londonderry to Moville, .	—	—	—	—	—	—	—	—	—	—	—
Moville to Londonderry, .	—	63	—	—	63	—	—	—	—	—	—
Ballina to Sligo, .	—	—	—	—	—	—	—	—	—	—	—
Belmullet " .	21	87	—	—	108	—	—	—	118	—	118
Westport " .	—	—	—	—	—	—	—	—	—	—	—
Total, .	21	87	—	—	108	—	—	—	118	—	118
Sligo to Belmullet, .	—	3	—	—	3	—	—	—	—	—	—
Milford to Mulroy, .	—	—	—	—	—	—	—	—	—	—	—
Mulroy to Milford, .	—	—	—	—	—	—	—	—	—	—	—
Belfast to Waterford, .	—	—	—	—	—	—	—	—	—	—	—
Leitbeg to Mulroy, .	—	—	—	—	—	—	—	—	—	—	—
Total, .	232	194	2	93	521	122	46	168	463	2	465

INLAND NAVIGATION.

Ireland during the Three Months ended 30TH JUNE, 1914, showing and Debarkation.

Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	IRISH PORTS.
	Stallions.	Mares.	Geldings.	Total.				
—	—	—	—	—	—	—	—	Cork to Aghada Pier. " to Belfast. " to Spike Island. " to Queenstown. " to Waterford.
—	—	—	—	—	—	—	—	
—	—	4	—	4	—	—	4	
—	—	—	—	—	—	—	—	
—	—	4	—	4	—	—	4	Total.
—	—	—	—	—	—	—	—	Aghada Pier to Cork. Belfast " Spike Island " Queenstown " Waterford "
—	—	—	—	—	—	—	2	
—	—	—	—	—	—	—	—	
—	—	—	—	—	—	—	—	
—	—	—	—	—	—	—	2	Total.
—	—	—	—	—	—	—	21	Waterford to Ballyhack. " to Belfast. " to Duncannon.
—	—	—	1	1	—	1	1	
—	—	—	—	—	—	18	85	
—	—	—	1	1	—	18	107	Total.
—	—	—	—	—	—	—	162	Ballyhack to Waterford.
—	—	—	1	1	—	—	1	Dublin to Belfast.
—	—	1	—	1	—	—	390	Duncannon to Waterford.
—	—	—	—	—	—	—	174	Kilrush to Limerick. Kildysart " Glin " Portumna " Tarbert " Kilkee "
—	—	—	—	—	—	—	—	
—	—	—	—	—	—	—	—	
—	—	—	—	—	—	—	—	
—	—	—	—	—	—	—	—	
—	—	—	—	—	—	—	—	
—	—	—	—	—	—	—	174	Total.
—	—	—	—	—	—	—	—	Milford to Portrush.
—	—	—	—	—	—	—	47	Belfast to Dublin.
—	—	—	—	—	—	—	—	Londonderry to Moville.
—	—	—	—	—	—	—	63	Moville to Londonderry.
—	—	—	—	—	—	—	—	Ballina to Sligo. Belmullet " Westport "
—	—	—	—	—	—	—	226	
—	—	—	—	—	—	—	—	
—	—	—	—	—	—	—	226	Total.
—	—	—	—	—	—	—	3	Sligo to Belmullet.
—	—	—	—	—	—	—	—	Milford to Mulroy.
—	—	—	—	—	—	—	—	Mulroy to Milford.
—	—	1	5	6	—	—	6	Belfast to Waterford.
—	—	—	—	—	—	—	—	Leitbeg to Mulroy.
—	—	6	7	13	—	18	1,185	Total

RETURN of the NUMBER of HORSES EXPORTED from IRELAND through GREAT BRITAIN to the COLONIES and FOREIGN COUNTRIES during the THREE MONTHS ended 30TH JUNE, 1914, showing the Ports of Embarkation in Ireland.

PORTS.	Number of Horses.			
	Stallions.	Mares.	Geldings.	Total.
Belfast,	—	164	151	315
Cork,	—	—	—	—
Dublin,	—	197	133	330
Dundalk,	—	—	—	—
Greenore,	—	1,606	788	2,394
Waterford,	—	169	129	298
Wexford,	—	—	—	—
Total,	—	2,136	1,201	3,337

RETURN of the NUMBER of HORSES IMPORTED into IRELAND through GREAT BRITAIN from the COLONIES and FOREIGN COUNTRIES during the THREE MONTHS ended 30TH JUNE, 1914, showing the Ports of Debarkation in Ireland.

PORTS.	Number of Horses.			
	Stallions.	Mares.	Geldings.	Total.
Belfast,	—	—	—	—
Dublin,	—	—	—	—
Wexford,	—	—	—	—
Total,	—	—	—	—

RETURN of the NUMBER of HORSES EXPORTED from IRELAND direct to FOREIGN COUNTRIES during the THREE MONTHS ended 30TH JUNE, 1914, showing the Ports of Embarkation in Ireland.

PORTS.	Number of Horses.			
	Stallions.	Mares.	Geldings.	Total.
Cork,	—	—	—	—
Limerick,	—	—	—	—
Total,	—	—	—	—

DISEASES OF ANIMALS IN IRELAND.

NUMBER of OUTBREAKS of SWINE FEVER, and NUMBER of SWINE returned as having been SLAUGHTERED in Ireland, under the Diseases of Animals Act of 1894, in the undermentioned period, by Order of the Department.

Quarter ended	SWINE FEVER.	
	Outbreaks confirmed.	Swine Slaughtered as Diseased or as having been Exposed to Infection.
30th June, 1914,	36	275

NUMBER of OUTBREAKS reported as having taken place, and NUMBER of ANIMALS returned as having been Attacked by ANTHRAX, GLANDERS and FOOT AND MOUTH DISEASE in Ireland in the undermentioned period.

Quarter ended	ANTHRAX.		GLANDERS (including Farcy).		Foot and Mouth Disease.	
	Outbreaks Reported	Animals Attacked	Outbreaks Reported.	Animals Attacked.	Outbreaks Reported.	Animals Attacked.
30th June, 1914,	1	1	—	—	22	235

NUMBER of CASES of RABIES in DOGS in IRELAND during the undermentioned period.

Quarter ended	Number of Cases.
30th June, 1914,	—

NUMBER of OUTBREAKS reported as having taken place, and NUMBER of ANIMALS returned as having been attacked by SHEEP-SCAB and PARASITIC-MANGE in Ireland in the undermentioned period.

Quarter ended	SHEEP-SCAB.		PARASITIC-MANGE.	
	Outbreaks Reported.	Sheep Attacked.	Outbreaks Reported.	Animals Attacked.
30th June, 1914,	44	330	14	22

Veterinary Branch,
Department of Agriculture and Technical Instruction
for Ireland, Dublin.

ACCOUNT showing the QUANTITIES of certain kinds of AGRICULTURAL
into Ireland during each WEEK

ARTICLES	WEEK ENDED				
	4th April	11th April	18th April	25th April	2nd May
ANIMALS LIVING—					
Horses, No.	—	—	—	—	—
FRESH MEAT—					
Beef (including refrigerated and frozen), cwt.	—	—	—	—	—
Mutton, " " " " " "	—	—	—	—	—
Pork, " " " " " "	40	—	—	—	—
Unenumerated, " " " " " "	—	—	—	—	—
SALTED OR PRESERVED MEAT—					
Bacon, cwt.	—	53	41	4	88
Beef, "	—	—	—	—	—
Hams, "	—	59	—	—	—
Pork, "	—	—	—	—	—
Meat, unenumerated, Salted " "	—	—	—	27	—
Meat, preserved otherwise than by salting (including tinned and canned), cwt.	—	1	—	2	—
DAIRY PRODUCE AND SUBSTITUTES—					
Butter, cwt.	—	—	—	—	—
Margarine, "	391	96	262	204	257
Cheese, "	—	—	—	—	—
Milk, Condensed, "	168	27	16	132	70
" Cream, "	—	—	—	—	—
" Preserved, other kinds " "	—	—	—	—	—
EGGS, gt. hunds.	—	—	—	60	—
LARD, cwt.	347	—	122	7	18
CORN, GRAIN, MEAL AND FLOUR—					
Wheat, cwt.	240,200	195,800	94,400	252,600	—
Wheat, Meal and Flour, "	45,800	1,200	13,400	36,600	3,200
Barley, "	—	—	—	—	—
Oats, "	27,700	—	17,100	13,800	—
Peas, "	50	50	—	—	60
Beans, "	1,720	—	—	—	—
Maize, or Indian Corn, "	148,200	50,300	185,100	168,100	—
FRUIT, RAW—					
Apples, "	—	—	—	—	—
Currants, "	—	—	—	—	—
Gooseberries, "	—	—	—	—	—
Pears, "	—	—	—	—	—
Plums, "	—	—	—	—	—
Grapes, "	—	—	—	—	—
Lemons, "	—	—	—	—	—
Oranges, "	—	—	—	—	—
Strawberries, "	—	—	—	—	—
Unenumerated, "	—	—	—	—	—
HAY, tons,	—	—	—	—	—
STRAW, "	—	—	—	—	—
MOSS LITTER, "	60	—	110	97	35
HOPS, cwt.	—	—	—	—	—
VEGETABLES, RAW—					
Onions, bushels	—	—	—	—	—
Potatoes, cwt.	—	—	—	—	—
Tomatoes, "	—	—	—	—	—
Unenumerated, value £	—	—	—	—	3
VEGETABLES, DRIED, . . . cwt.	—	—	—	50	—
Preserved by Canning, . . . "	—	—	—	—	18
POULTRY AND GAME, . . . value £	—	—	—	—	—

*This Table is confined to the Imports of certain kinds of Agricultural Produce into to a request from this Department kindly consented to separate the Irish Imports (direct) form of Weekly Returns

EMIGRATION FROM IRELAND.

TABLE showing, by Destinations, the Numbers of Emigrants (Natives of Ireland) who left the Ports of Ireland during the months of April, May and June, 1914, and the total for the Six Months ended the 30th June, 1914, together with the total Number of Emigrants in each of the corresponding periods of the year 1913.

DESTINATION.	April, 1914.	May, 1914.	June, 1914.	Six Months ended 30th June, 1914.
FOREIGN COUNTRIES AND THE COLONIES :—				
America (U.S.), . . .	4,299	2,831	907	9,625
Canada, . . .	649	581	372	2,087
South Africa, . . .	13	10	21	77
Australia, . . .	73	91	79	438
New Zealand, . . .	17	7	8	64
Other Countries, . . .	4	2	4	17
Total, . . .	5,055	3,522	1,391	12,308
GREAT BRITAIN :—				
England and Wales, . . .	73	105	68	514
Scotland, . . .	16	21	1	87
Total, . . .	89	126	69	601
General Total, 1914,	5,144	3,648	1,460	12,909
General Total, 1913,	6,171	6,069	2,908	18,869

The figures in the above Table have been abstracted from the monthly Return published by the Registrar-General for Ireland.

The figures are subject to revision in the Annual Report.

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